ASID ANZMIG

MYCOLOGY MASTERCLASS

PREVENTING AND TREATING FUNGAL INFECTIONS, ONE COURSE AT A TIME.

20 YEARS

THINK FUNGUS

Meetings Held

Hamilton Island – 2003, 2005, 2007, 2009, 2011

Kingscliff – 2013

Melbourne – 2015

Kingscliff – 2017, 2019, 2023

Contents

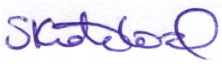
Dear Colleague,

On behalf of the Australia and New Zealand Mycoses Interest Group (ANZMIG) and the Australasian Society for Infectious Diseases (ASID), it is my great pleasure to welcome you to the 10th Mycology Masterclass here in Kingscliff NSW.

This year, we mark the twentieth anniversary of the Mycology Masterclass. From its first iteration in 2003, held on Hamilton Island QLD, the inaugural Mycology Masterclass was convened by Assoc. Prof. David Ellis with a faculty of nine, and just 40 delegates. It was immensely popular and has been held every second year since then - except 2021 - and over time has evolved to include 80 delegates and a faculty of 20. I have had the immense honour of convening the Mycology Masterclass in Kingscliff since 2013.

Attendees of the 1st (2003, top) and 9th (2019, bottom) Mycology Masterclasses

Throughout the past twenty years, the purpose of Mycology Masterclass has remained to deliver first class education on the latest developments in clinical and diagnostic mycology, provided by a Faculty of Australia's key opinion leaders in the field. Delegates can look forward to two and a half days of interactive sessions, poster viewing, and social events designed to engage participants, make new friends, and promote informal networking.



Sarah Kidd, PhD FASM FECMM

Convenor

Acknowledgement of Country

We are meeting on the traditional lands of the Bundjalung people. We pay our respects to their Elders past, present and emerging. We recognise and respect their cultural heritage, beliefs, and relationship with the land, which continue to be important to the Bundjalung people living today.

Venue
Mantra on Salt Beach, Gunnamatta Ave, Kingscliff – Plantation Room

The registration desk will be open from 0730 Thursday 2nd November, and will be located inside the Plantation Room.

Transfers – Coolangatta Airport to Mantra Kingscliff
Transfer can be booked with Salt Transfer - 0419 250 604, approx. 20 min journey.

WIFI access
Network: Mantra, Password: mantra

Presentations & Posters
All presentations and the poster display will be in the Plantation Room.

Social Program
The **Welcome and Poster** session will be held **Thursday 2nd November** on the Mantra Pool Deck from 1800-2000. Poster authors will be in attendance to discuss their posters – please make time to visit with them.

The **ANZMIG Dinner** will be held **Friday 3rd November** in the Plantation Room, with pre-dinner drinks on the Mantra Pool Deck from 1900. Be ready for a great night of entertainment and a chance to catch up with colleagues. Extra tickets are required for partners.

If you are unable to attend either of the social events please let us know.

Time Zones
A reminder that Coolangatta is on QLD time and Kingscliff is on NSW Time, with NSW 1 hour ahead of QLD.

PCO
Lesley Woods – 0418 870 057

FACULTY LIST

CONVENOR | Sarah Kidd

Mycology Masterclass is organised under the auspices of ANZMIG

FACULTY

Prof Jan-Willem Alffenaar	Sydney Infectious Diseases Institute and School of Pharmacy, University of Sydney
A/Prof Justin Beardsley	Sydney Infectious Diseases Institute, University of Sydney, Sydney
Prof Sharon Chen	Centre for Infectious Diseases & Microbiology, NSW Health Pathology, Westmead Hospital, and University of Sydney, Sydney
Dr Celia Cooper	Infectious Diseases, Women's and Children's Hospital, Adelaide
Dr Abby Douglas	Dept. Infectious Diseases, Peter MacCallum Cancer Centre, Melbourne
A/Prof David Ellis	School of Biological Sciences, University of Adelaide, Adelaide
Dianne Gardam	PathWest Laboratory Medicine, Fiona Stanley Hospital, Perth
Dr Kate Garnham	Dept. Infectious Diseases, Gold Coast Hospital, Gold Coast
Dr Nicky Gilroy	Centre for Infectious Diseases & Microbiology, NSW Health Pathology, Westmead Hospital, Westmead
Dr Catriona Halliday	Centre for Infectious Diseases and Laboratory Services, NSW Health Pathology, Westmead Hospital, Sydney
Dr Caitlin Keighley	Southern.IML Pathology, Wollongong
Dr Karina Kennedy	Dept. Microbiology, Canberra Hospital, Canberra
Dr Sarah Kidd	National Mycology Reference Centre, SA Pathology, Adelaide
Prof Richard Malik	Centre for Veterinary Education, University of Sydney, Sydney
Prof Debbie Marriott	Dept. Clinical Microbiology & Infectious Diseases, St Vincent's Hospital, Sydney
Dr Brendan McMullan	Immunology & Infectious Diseases, Sydney Children's Hospital, Randwick
Dr Luisa Monteiro de Miranda	Sydney School of Veterinary Science, University of Sydney, Sydney
Dr Arthur Morris	Dept. Microbiology, LabPlus, Auckland City Hospital, Auckland, New Zealand
Prof Orla Morrissey	Dept. Infectious Diseases, Alfred Health and Monash University, Melbourne
Prof Monica Slavin	Dept. Infectious Diseases, Peter MacCallum Cancer Centre, Melbourne
Dr Ben Teh	Dept. Infectious Diseases, Peter MacCallum Cancer Centre, Melbourne
Dr Michelle Yong	Dept. Infectious Diseases, Peter MacCallum Cancer Centre, Melbourne

PCO | Lesley Woods, on behalf of ASID Events **MMCX@internode.on.net**

PROGRAM

Thursday 2nd November 2023 | Plantation Room

REGISTRATION FROM 7.30AM

8:50am – 9:00am **Welcome and Opening Remarks** *Sarah Kidd*

SESSION 1 | Priorities in Fungal Pathogens

Session Chair: ***Sharon Chen***

9.00am – 10.30am
WHO fungal priority pathogen list
Justin Beardsley
Fungal nomenclature: managing change is the name of the game
Sarah Kidd
Panel Discussion: *Jan-Willem Alffenaar, Justin Beardsley, Catriona Halliday*, *Sarah Kidd, Orla Morrissey,* led by *Sharon Chen*

10.30am – 11.00am MORNING TEA

SESSION 2 | Unmet Needs in the Management of Aspergillosis

Session Chair: ***Orla Morrissey***

11.00am – 12.30pm
Prevention of aspergillosis
Ben Teh
Diagnostic tools for aspergillosis
Catriona Halliday
Treatment and trials
Karina Kennedy

12.30pm – 1.30pm LUNCH BREAK

SESSION 3 | Yeast Infections

Session Chair: ***Caitlin Keighley***

1.30pm – 3.00pm
Emerging uncommon yeast threats
Sharon Chen
Resistance in *Candida* (and former *Candida*) species
Sarah Kidd
Treatment, trials, and unmet needs
Monica Slavin

3.00pm – 3.30pm AFTERNOON TEA

SESSION 4 | From The Laboratory

Session Chair: ***Arthur Morris***

3.30pm – 5.00pm
Harnessing genomics for fungal diagnostics and surveillance
Sharon Chen
Diagnostic stewardship
Kate Garnham
The role of clinical mycology laboratories and reference laboratories: Panel discussion. *Dianne Gardam, Kate Garnham, Catriona Halliday, Sarah Kidd, Arthur Morris,* led by *Sharon Chen*

6.30pm – 8.30pm **Welcome Mixer and Jennifer Antonino Poster Viewing | Mantra Pool Deck**

~ Included in registration for all delegates, faculty, and sponsors ~

Friday 3rd November 2023 | Plantation Room

REGISTRATION FROM 8.00AM

SESSION 5 | Stewardship, Surveillance and Sentinels

Session Chair: ***Celia Cooper***

9:00am – 10.30am
Antifungal stewardship
Abby Douglas
Surveillance and infection prevention
Nicky Gilroy
Animals as sentinels for human fungal infections
Luisa Monteiro de Miranda

10.30am – 11:00am MORNING TEA

SESSION 6 | Therapeutic Drug Monitoring

Session Chair: ***Justin Beardsley***

11:00am – 12.30pm
What we forgot but need to remember
Jan-Willem Alffenaar
Off to the bedside
Debbie Marriott
The **ultimate** patient personalized dosing journey quiz
Zachary Webb-Harvey

12.30pm – 1.30pm LUNCH BREAK

SESSION 7 | The David Ellis Oration

Session Chair: ***Sarah Kidd***

1.30pm – 2.30pm
Dr Teresa Lebel
State Herbarium of South Australia, Adelaide

2.30pm – 3.00pm AFTERNOON TEA

SESSION 8 | Co-Infections and Fungal Masqueraders

Session Chair: ***Brendan McMullan***

3.00pm – 4.45pm
Fungal-respiratory virus co-infections
Michelle Yong
Cryptococcosis: what's new?
Justin Beardsley
When is a fungus not a fungus?
Caitlin Keighley and *Richard Malik*

7.00pm – Late
The ANZMIG Dinner | Plantation Room
~ Included in registration for all delegates, faculty, and sponsors ~
Poster Prize Presentation
David Ellis
Mycology Jeopardy
with Quizmaster Richard Malik

Saturday 4th November 2023 | Plantation Room

REGISTRATION FROM 8.00AM

SESSION 9 | Fungal Infections in Children

Session Chair:	***Catriona Halliday***
9.00am – 10.30am	Fungal infection and primary immunodeficiency *Celia Cooper* Neonatal candidiasis *Brendan McMullan* Case presentations *Faten Jebreen, Robyn Silcock, Linny Phuong*
10.30am – 11.00am	MORNING TEA

SESSION 10 | Non-*Aspergillus* Mould Infections

Session Chair:	***Monica Slavin***
11.00am – 12.20pm	Emerging threats *Orla Morrissey* Role of molecular diagnostics and imaging *Arthur Morris* Unmet needs in the management of non-*Aspergillus* mould infections. Panel Discussion: *Orla Morrissey, Arthur Morris, Sharon Chen, Karina Kennedy*, led by *Monica Slavin*
12:20pm – 12:30pm	**Closing Remarks** *Sarah Kidd*

Poster Abstracts

1. Benomyl agar to screen for environmental azole resistance in *Aspergillus fumigatus sensu stricto*

Authors: McKinney WP[1], Kidd SE[2], Halliday C[3], Morris AJ[1].
[1] *Mycology Laboratory, LabPLUS, Auckland City Hospital, Auckland, New Zealand.*
[2] *National Mycology Reference Centre, SA Pathology, Adelaide, South Australia.*
[3] *Institute of Clinical Pathology and Medical Research, NSW Health Pathology, Sydney, NSW*

Background: Azole resistance in *Aspergillus fumigatus* complex is increasing. A chance observation suggested that azole resistant *A. fumigatus sensu stricto*, due to tandem-repeat (TR) *Cyp51A* mutations, could grow on benomyl agar. Benomyl is a methyl benzimidazole carbamate fungicide used in agriculture. It arrests cell division by stopping mitosis.

Aim: To determine the utility of potato-dextrose benomyl agar (PDBA) (2µg/mL) in screening for TR-azole resistant *A. fumigatus sensu stricto.*

Methods: Routine *Aspergillus* species isolates were screened on PDBA and had antifungal susceptibility testing performed by Sensititre YeastOne broth microdilution. Selected isolates were speciated by β-tubulin gene sequencing. 131 *Aspergillus* isolates (including 22 *A. fumigatus sensu stricto* with known azole-resistant genotypes; either TR mutations, n=10, or *Cyp51A* hot spot mutations, n=12) were inoculated onto PDBA and a potato-dextrose agar control slope. Slopes were read on days 2 and 7.

Results: Two days incubation was sufficient for growth on PDBA. All 10 *A. fumigatus sensu stricto* isolates with TR mutations had moderate to profuse growth on PDBA. None of the 12 with only *Cyp51A* hot spot mutations grew on PDBA. None of the 94 *A. fumigatus* complex isolates, for which the azole MICs were wild type, grew on PDBA.

Conclusions: For *A. fumigatus sensu stricto*, PDBA reliably separates isolates with TR-mutations from those with hot spot mutations. If confirmed with more isolates with known *Cyp51A* mutations PDBA would be a useful medium for screening environmental *Aspergillus* isolates for TR-related azole resistance, e.g., crops, gardens and compost.

2. Arrival of environmental azole resistance in *Aspergillus fumigatus sensu stricto* in New Zealand

Authors: McKinney WP[1], Morris AJ[1]

[1] *Mycology Laboratory, LabPLUS, Auckland City Hospital, Auckland, New Zealand*

Background: Azole resistance in *Aspergillus fumigatus* complex (*Afc*) is increasing globally but is uncommon in New Zealand (NZ), ~2%, and for *A. fumigatus sensu stricto* (*Afss*) has only been due to *Cyp51A* hot spot, not tandem repeat (TR), mutations. TR-associated resistance is associated with acquisition of environmental stains exposed to azole containing fungicides used in agriculture.

Aim: To report the arrival of environmental TR-associated azole resistant *Afss* in NZ.

Methods: *Aspergillus* species had antifungal susceptibility testing performed by Sensititre YeastOne (SYO) broth microdilution. Isolates were speciated by β-tubulin gene sequencing and had resistance genotype determined by promoter region and *Cyp51A* gene sequencing. Azole fungicide use in NZ was reviewed and availability of "over the counter" azole fungicides investigated.

Results: Since July 2021 there have been 10 isolates with azole resistance on SYO testing, nine were *Afss*. Genotyping detected hot spot mutations in four and TR-associated resistance in six: TR_{46}/Y121F/T289A (in four) and TR_{34}/L98H/M172I/G448S (in two). All TR-positive strains grew on benomyl screening agar (2µg/mL). Patient interviews did not identify obvious exposure to azole containing fungicides. At least seven patients had received recent azole treatment before their resistant isolate. None had invasive infection. Surveillance of fungicide use is now no longer performed in NZ. Azole containing fungicides are available "over the counter" in garden centers.

Conclusions: TR-associated azole resistant *Afss* have recently emerged in NZ. Patients have often received recent azole treatment. Better advice is needed for patients on how to avoid potential high-risk exposures to azole resistant *Afc*.

3. Yeast Or Mold? A Case Of *Trichosporon* Fungemia

Authors: *Huang, Wenjie*[1], *Tan, Mei Gie*[1], *Tan, Yen Ee*[1]
[1] *Singapore General Hospital, Singapore*

An elderly lady with a history of colon cancer for conservative management was admitted for influenza. While inpatient, she developed a fever and full septic workup was performed. Two days later, blood cultures flagged positive. Gram stain revealed blastoconidia with possible pseudohyphae and subculture was performed onto solid media. The provisional impression was candidemia secondary to gastrointestinal translocation and the patient was started on intravenous anidulafungin.

After overnight incubation, small white and blue colonies grew on Sabouraud Dextrose Agar and CHROMagar Candida respectively. Mass spectrometry revealed a presumptive identity of *Trichosporon* species. Retrospective review of the Gram stain demonstrated scanty septated hyphae and arthroconidia in some microscopic fields.

The result was urgently communicated to the clinician and antimicrobial therapy switched to voriconazole. Internal transcribed spacer sequencing subsequently confirmed the identity as *Trichosporon faecale*. Antifungal susceptibility testing performed using Sensititre YeastOne revealed the following minimum inhibitory concentrations in µg/ml: anidulafungin >8; micafungin >8; caspofungin >8; posaconazole 1, voriconazole 0.25, fluconazole 8, amphotericin B 2. Unfortunately, the patient passed away subsequently.

Learning points

Trichosporon can cause invasive infections in immunocompromised individuals, with fungemia being associated with a poor prognosis. Despite being a yeast, the pathogen may have morphological features similar to filamentous fungi, such as arthroconidia and hyphae, in blood cultures. Careful examination of the Gram stain, correlation with colonial morphology and prompt communication with clinicians are advised to guide antifungal treatment. *Trichosporon* is intrinsically resistant to echinocandins which is the first-line treatment for candidemia in our institution.

Ethics declaration

This material is the authors' own original work and has not been previously published elsewhere. The authors have no conflicts of interest to declare.

4. A Rare Case Of *Volvariella volvacea* Pneumonia

Authors: Huang, Wenjie[1], Tan, Mei Gie[1], Chow, Chun Yuen[1], Tan, Yen Ee[1]
[1] Singapore General Hospital, Singapore

A middle-aged lady with a history of leukaemia was electively admitted for a stem cell transplant. She developed hypotension on day 21. Septic workup revealed *Staphylococcus epidermidis* bacteremia and chest imaging showed dense consolidation with ground glass opacification in both lungs.

Due to concerns of invasive fungal infection, the patient was started on oral isavuconazole. However, due to a lack of clinical response, isavuconazole was later switched to liposomal amphotericin B to cover for possible *Mucorales*.

Sputum cultures subsequently returned positive for *Paecilomyces variotii.* Antifungal susceptibility testing revealed a minimum inhibitory concentration of 1.0 µg/ml to isavuconazole. The patient was restarted on isavuconazole. Nevertheless, despite dual antifungal therapy with isavuconazole and liposomal amphotericin B, she deteriorated and required ventilatory support.

At intubation, no endobronchial lesions suggestive of airway invasive fungal disease were seen, but pus occluding segments of the bronchial tree bilaterally was noted. Histology of the mucus plug revealed septated hyphae at acute angles. A thorough physical examination was performed and did not reveal any skin lesions suggestive of *Fusarium*.

Bronchoalvoleolar lavage cultures performed on Sabouraud Dextrose Agar at 30^{o}C recovered a non-sporulating mould two days later. Internal transcribed spacer and D1/D2 sequencing confirmed identity as *Volvariella volvacea.* The patient was additionally started on nebulized and intravenous liposomal amphotericin B. Unfortunately, she demised.

Learning points

Volvariella volvacea (straw mushroom) is a common ingredient used in Asian cuisine. However, the basidiomycete can also cause invasive disease in immunocompromised individuals. The optimal treatment of choice is yet to be established.

Ethics declaration

This material is the authors' own original work and has not been previously published elsewhere. The authors have no conflicts of interest to declare.

5. Probiotic Perforation Problem

Authors: *Trewcott, Brooke [1], Higgins, Ammie [1], Walczak, Andrew [1], Lee, Gar-hing [1]*
[1] Department of Microbiology, PathWest Laboratory Medicine WA, Nedlands, Western Australia

Probiotic use is common in community settings, particularly following antibiotic treatment. However, instances of deep seated infection due to probiotic use have occasionally been described.

We describe a case of polymicrobial mediastinitis in a three-year-old girl complicating oesophageal perforation after ingestion of a toy umbrella. Amongst mixed organisms, *Saccharomyces* species were identified in cultures from sterile sites. At the time, the patient was taking a probiotic.

A subsequent investigation tested to see if the yeast could have come from the probiotic which may have contributed to the infection.

Cultures obtained from probiotic products were compared with clinical isolates both phenotypically and genotypically with results to be presented in this report.

As probiotic use continues to increase this practice must be tempered by consideration of the safety aspects of administration.

Ethical compliance

This was a laboratory focused case study involving the organism involved in a complex infection. Confidentiality and anonymity of the patient has been maintained with no identifying patient details included.

6. Challenges in the Management of Cerebral Aspergillosis in an Immunocompetent Patient Acquired in the Post-Sepsis Setting

Author: *Jordan, Victoria*[1,2]
[1] *Microbiology, NSW Health Pathology, John Hunter Hospital, New Lambton Heights, NSW 2304*
[2] *School of Medicine and Public Health, University of Newcastle, Callaghan, NSW, 2308*

Isolated cerebral disease is a severe manifestation of invasive aspergillosis. We describe a case of potentially hospital-acquired disease and the challenges associated with salvage therapy in the context of incomplete resection and administered in the ambulatory setting.

A 73-year-old man was admitted with a midline occipital brain abscess found during investigation of headaches that had developed during a prolonged hospital admission with bacterial sepsis 12 months prior. The disease progressed despite empirical antibiotic treatment. Operative management was subsequently pursued, limited due to location, with *Aspergillus fumigatus* complex growing from cultures. Despite three months of voriconazole following this, progress imaging showed ongoing deterioration. A salvage approach was commenced with the addition of caspofungin, and given that the patient remained clinically well, this was completed on an outpatient basis via daily infusor. After six weeks the patient's headaches had significantly improved for the first time since onset, leading to the decision to cease dual therapy and continue voriconazole monotherapy indefinitely. Progress imaging at the two- and six-month mark showed continued improvement.

This case highlights the importance of awareness of post-sepsis immunosuppression and considering a broad differential diagnosis for brain abscess in this context. Additionally, while first-line treatment of cerebral aspergillosis is clear, best practice for salvage therapy, including duration and utility of combination therapy, is less defined. Further evidence is required, including options compatible with outpatient administration given the prolonged treatment durations associated with this condition.

Patient information remained de-identified and stored on a password-protected hard drive. Formal ethics approval was not required given the nature of the report.

7. *Verruconis gallopava* peritoneal-dialysis related peritonitis: A case report and literature review

Authors: *Brell, Nadiya[1], Jones, Sandra[1], Newton, Peter[1]*
[1] Microbiology, NSW Health Pathology, Wollongong Hospital; Wollongong, NSW, Australia.

Verruconis gallopava (formerly *Ochroconis gallopava*) is a thermophilic, melanised hyphomycete found in warm environmental sources such as geothermal soils, compost and hot springs. It is a neurotropic fungus known to cause central nervous system (CNS) infections in both humans and animals.

We report the second case to date of fungal peritoneal-dialysis (PD) related peritonitis secondary to *Verruconis gallopava* without dissemination to the CNS in a 49 year old woman presenting with abdominal pain and difficulties dialysing. This occurred in the context of a previous kidney-pancreas transplant for type-1 diabetes mellitus with failing graft function and subsequent commencement of automated peritoneal dialysis.

She was successfully treated with PD catheter removal and a four-week course of anti-fungal therapy (including ten days of intravenous liposomal amphotericin and 18 days of oral posaconazole).

8. Disseminated *Cryptococcus* Leading To Severe Hypercalcaemia

Authors: *Murray, Jessica [1], Elias, Anthony [1], Robertson, Mark [1]*
[1] Gosford Hospital, Central Coast local health district, NSW, Australia

A 63 year old male presented 1 week after commencement of antiretroviral therapy for Human Immunodeficiency Virus (CD4 count 21cells/umL). He presented to hospital with hypercalcaemia (3.96mmol/L), acute kidney injury, splenomegaly and pancytopenia. His cryptococcal antigen (CrAg) was initially non-reactive. His hypercalcaemia was subsequently treated with intravenous fluid and 90mg of intravenous pamidronate in divided doses over a 4-day period. Blood cultures then returned a positive result for *Cryptococcus neoformans* and the previous CrAg result was found to be false-negative due to prozone phenomenon (negative at 1:50 dilution). It was suspected that a haematological malignancy was driving his hypercalcaemia as he had a suppressed parathyroid hormone (1.2pmol/L) and normal 25-hydroxy vitamin D level (57mmol/L). However, his bone marrow aspirate most predominantly identified granulomatous inflammation with multiple round cytoplasmic inclusions suggestive of disseminated cryptococcus. A small population of a low-grade lymphoblastic lymphoma was also identified, unlikely to be associated with hypercalcaemia. Additionally, a cervical lymph node biopsy only identified cryptococcus infiltration. Treatment for his cryptococcus (liposomal amphoteracin B and flucytosine) was commenced following diagnosis and within 10 days his corrected calcium level dropped to well below reference range (nadir 1.7mmol/L). He had to be started on high dose calcium carbonate (1200mg three times daily) then calcitriol (250 micrograms twice daily). After his 1,25-dihydroxy vitamin D levels from admission returned a very elevated level (>480pmol/L), his hypercalcaemia was retrospectively judged to be due to cryptococcal infection and granulomatous inflammation.

9. Disseminated Microsporidial Infection In A Lung Transplant Recipient

Authors: *Watson, Anna[1], Matic, Marko[2], Robertson, Thomas[3], Stewart, Alexandra[4]*
[1] Infectious Diseases, Royal Brisbane and Women's Hospital, Brisbane.
[2] Nuclear Medicine, Royal Brisbane and Women's Hospital, Brisbane.
[3] Pathology, Royal Brisbane and Women's Hospital, Brisbane.
[4] Infectious Diseases, Royal Brisbane and Women's Hospital, Brisbane.

A 54yo male was admitted with four months of myalgia, headaches, hypercalcaemia and declining renal function on a background of lung transplantation for cystic fibrosis five years prior. Magnetic resonance imaging confirmed myositis and a muscle biopsy revealed invasive muscular microsporidial infection. Microscopy identified patchy mononuclear cell inflammation associated with foci of muscle fibre necrosis. Intracellular aggregates as well as extracellular spore-like organisms with a diameter of up to 3µm consistent with microsporidia were present in areas of muscle inflammation. Moderate red staining on Gomori Trichome staining was evident. PCR on muscle tissue and corneal scrapings confirmed the species as *Anncaliia algerae.* Positron emission tomography/computed tomography (PET/CT) revealed widespread dissemination. It is likely that there was muscular, ocular, central nervous system, vocal cord, parapharyngeal and renal involvement. Immunosuppression was reduced and albendazole 400mg PO BD was commenced. After a one week systemic inflammatory response syndrome, the patient improved. Repeat PET scan at 3 months showed near complete resolution of avid lesions and complete resolution at 6 months. Therapy is planned for a minimum of 12 months with a consideration for secondary prophylaxis.

While microsporidia are obligate intracellular spore-forming eukaryote parasites, they are related to fungi and can be misdiagnosed as such. Infection is typically seen in immunocompromised individuals. *Anncaliia algerae* is known to infect mosquitoes, larvae and contaminate water supplies. The patient resides on a rural property in Northern NSW with presumed acquisition via inhalation or ingestion of residential rainwater contaminated with spores.

11. Destructive *Aspergillus fumigatus sensu stricto* osteomyelitis in an apparently immunocompetent patient

Authors: *Sivalingam, Varsha* [1], *Swan, Christopher* [2]
[1] *Department of Infectious Diseases and Microbiology, Institute of Clinical Pathology & Medical Research (ICPMR), Westmead Hospital*
[2] *Department of Infectious Diseases and Microbiology, Nepean Hospital*

A fifty-six-year-old immunocompetent female office worker presented with a three-month history of thoracic back pain and significant weight loss. On examination, she was afebrile with significant thoracic spine tenderness. The C-reactive protein level was moderately elevated (66mg/L) but there was no leukocytosis.

Computed tomography revealed loss of disc space height with subchondral lucency and endplate destruction at T7/8 with soft tissue thickening. Magnetic resonance imaging showed contrast enhancement in the same area with endplate destruction and epidural and prevertebral phlegmon.

One of two radiological biopsies revealed necrotising granulomatous inflammation with no organisms seen on histopathology. Bacterial, fungal, mycobacterial, and Nocardia spp. microscopy and culture and pan-bacterial, pan-fungal, and pan-mycobacterial polymerase chain reaction (PCR) tests were negative.

Empiric antimicrobials (flucloxacillin and ceftriaxone then piperacillin/tazobactam) were trialled post-biopsies with no clinical response and radiological progression. T7 vertebra collapse and spinal cord compression prompted neurosurgical intervention for spinal stabilisation. *Aspergillus fumigatus sensu stricto* was detected in phlegmon and vertebral body specimens via fungal culture and PCR. Histopathology revealed probable fungal elements in one of the eight specimens. Voriconazole was commenced then changed to posaconazole because the isolate exhibited an intermediate voriconazole minimum inhibitory concentration of 1 mg/L (CLSI).

Dedicated *Aspergillus* spp. PCR was positive when the previous biopsy samples were tested retrospectively. The patient currently continues posaconazole and awaits further immunological testing.

This case highlights the need to still consider *Aspergillus spp*. as a differential in atypical immunocompetent discitis/osteomyelitis. It also emphasises that targeted molecular assays have greater sensitivity over pan-fungal molecular assays.

12. Mucor fungaemia and COVID-19: A deadly combination

Authors: *Sun, Caitlyn* [1,2], *Gordon, David*[1,2]
[1] *Flinders Medical Centre, Department of Microbiology and Infectious Diseases, Bedford Park*
[2] *SA Pathology, Adelaide*

Mucorales species are ubiquitous organisms. Infection, particularly in immunocompromised hosts, is rapidly progressive and often fatal. Although angioinvasion is thought to be the main mechanism in the pathogenesis of disseminated mucormycosis, *Mucor* fungaemia remains rare. We report the sixth case of *Mucor* fungaemia.

A 70 year old female was admitted with subacute functional decline in the context of prolonged nosocomial mild COVID-19 infection. Her comorbidities included poorly controlled Type 2 Diabetes Mellitus and Chronic Lymphocytic Leukaemia (CLL), for which she had received a single dose of Bcl-2 inhibitor venetoclax and anti-CD20 monoclonal antibody obinutuzumab months prior to presentation.

Three weeks into her COVID-19 illness, two isolated fevers prompted a septic screen. Computed tomography of the lungs revealed multifocal consolidation within the right upper lobe, right lower lobe and left lower lobe, and diffuse bilateral ground-glass opacities.

The aerobic blood culture bottle flagged positive after two days. Fungal elements were seen on Gram stain. After 24 hours incubation, rapid growing cottony and fluffy yellow colonies were noted. Lactofuchsin and lactophenol cotton blue mounts were performed, revealing morphological features most consistent with *Mucor* species. Internal Transcribed Spacer (ITS) ribosomal rRNA sequencing confirmed a 100% match to *Mucor janssenii* (belonging to *Mucor circinelloides* complex).

A diagnosis of COVID-associated pulmonary mucormycosis was made. Further investigation additionally revealed the patient was hypogammaglobulinaemic. Despite commencement of antifungal therapy with intravenous anidulafungin and oral posaconazole, as well as administration of antivirals and intravenous immunoglobulin therapy, the patient died one week later.

Consent was obtained prior to presentation of this case report, and ethical compliance has been demonstrated.

13. Fluconazole resistant *Candida parapsilosis* due to an acquired G623R mutation in the *MRR1* gene

Authors: *Zhang, Frank [1], Crawford, Lucy [1,2], Leong, Lex [1,3], Weldhagen, Gerhard [1,4], Kidd, Sarah [1,4]*

[1] Microbiology and Infectious Diseases, SA Pathology, Adelaide, South Australia, Australia

[2] Infectious Diseases Department, Royal Darwin Hospital, Northern Territory, Australia

[3] Public Health and Epidemiology Laboratory, SA Pathology, Adelaide, South Australia, Australia

[4] National Mycology Reference Centre, SA Pathology, Adelaide, South Australia, Australia

We report a case of *Candida parapsilosis* sternal osteomyelitis and endocarditis, with acquired fluconazole resistance due to an *MRR1* mutation which developed during treatment.

A 59-year-old man underwent elective aortic valve replacement for severe aortic stenosis. On day 11 he developed sternal wound dehiscence and underwent debridement with removal of wires. Intra-operative cultures grew *Klebsiella aerogenes* and *C. parapsilosis*. Treatment for sternal osteomyelitis was initiated with meropenem and fluconazole. The sternal wound remained open with a vacuum assisted closure device and required eight further debridements prior to closure on day 38. He received eight weeks of ciprofloxacin with no repeat growth of *K. aerogenes*. Swab and tissue cultures persistently demonstrated growth of *C. parapsilosis* and he was discharged home on day 55 with ongoing oral fluconazole.

On day 75 he was readmitted with sternal wound dehiscence and *C. parapsilosis* bloodstream infection. Transthoracic echocardiogram demonstrated a mobile echogenicity on the native mitral valve consistent with infective endocarditis. Repeat antifungal susceptibility testing showed development of fluconazole resistance with an MIC of 8 µg/mL - previously 2 µg/mL on three successive isolates. Whole genome sequencing confirmed clonality of the four isolates and identified a non-synonymous mutation leading to a *G623R* substitution in the putative transcription factor *MRR1* gene of the fourth isolate. Treatment was changed to anidulafungin and voriconazole for six weeks followed by voriconazole monotherapy. Positron emission tomography scan at twelve months demonstrated persistent uptake consistent with chronic sternal osteomyelitis.

Candida sternal wound infections are challenging to treat and fluconazole resistance may develop in *C. parapsilosis* after prolonged treatment.

Informed consent was obtained in writing for the publication of this case report.

14. A black yeast in green clothes. A case of *Aureobasidium pullulans* masquerading as *Candida albicans* in a blood culture

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Aureobasidium pullulans is a dematiaceous yeast-like fungus with a worldwide distribution. Rarely isolated as a pathogen, it is often considered a saprophyte or skin commensal. The case presented demonstrates challenges in diagnosis of an uncommon cause of invasive fungal infection and highlights developing technologies to aid laboratory diagnosis.

An 82 year old male had aerobic and anaerobic blood cultures collected on admission to hospital with clinical notes on request form stating fever. At 98 hours the aerobic blood culture bottle flagged positive and large yeast cells were observed on Gram stain. Routine agar and commercial chromogenic candida agar were used to support the growth of the yeast and aid in identification. At 24 hours incubation this isolate mimicked the usual colonial appearance of *Candida albicans*. Identification of the isolate was not able to be confirmed on routine laboratory testing and was subsequently confirmed by polymerase chain reaction and sequencing at a reference laboratory 18 days after first growth occurred.

This case highlights the need for care to be taken in the use of chromogenic agar for assuming the identification of yeast isolates and the requirement for improved technologies and techniques to reduce turn around time for the identification of fungal isolates that are uncommonly encountered in the laboratory.

15. Liver Failure Complicating The Management of Fatal Disseminated *Histoplasma capsulatum* Infection in an Immunocompetent Host

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Histoplasma capsulatum causes the potentially life-threatening but poorly recognised syndrome of Histoplasmosis. In Australia, the dimorphic fungus is highly endemic to the eastern parts of Queensland and New South Wales. We report a case of endemic disseminated histoplasmosis in an immunocompetent host, whose management was complicated by liver failure.

A 54-year-old previously well immunocompetent truck driver who transported soil along eastern coastal Australia presented with a 2-month history of night sweats, 10kg of weight loss and progressive liver failure. He denied recreational exposure to caves or guano from bat or birds and had never travelled internationally. His preliminary histopathologic diagnosis in the absence of fungal staining was primary sclerosing cholangitis. Positron emission tomography showed extensive liver, bowel and abdominal lymph node disease with adrenal sparing. Additional biopsies of these organs revealed innumerable budding yeast cells. *Histoplasma capsulatum* was confirmed via panfungal polymerase chain reaction and via culture. Histoplasma serology was negative.

The patient received 4 weeks of liposomal amphotericin B (3mg/kg) and 3 weeks of corticosteroids with minimal clinical and biochemical improvement. After severe electrolyte derangements and post-surgical ileus necessitated intensive care support, he was transitioned to Posaconazole, chosen for its in vitro activity, intravenous formulation and reduced likelihood of drug induced liver injury compared to other azoles. The patient continued to deteriorate, reaching a peak bilirubin of 509umol/L prior to his untimely death.

We report a late presentation of fatal disseminated histoplasmosis in an immunocompetent host. More data guiding antifungal and corticosteroid management in liver failure is needed.

16. Encapsulating the diagnostics of cryptococcal infections – what to do when there is minimal capsule

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Cryptococcosis is caused by the environmental fungi in the *Cryptococcus gattii* species and *C. neoformans* species complexes. A major virulence factor in pathogenic cryptococci is the polysaccharide capsule. During infection, capsular components are released into the host and so the detection of cryptococcal antigen (CrAg) in blood and cerebrospinal fluid (CSF) is the cornerstone of diagnosis.

We describe a case an immunosuppressed 65-year-old woman with myelofibrosis on ruxolitinib who was referred to a tertiary referral hospital with multiple isolated solid lung nodules and a low-positive serum CrAg. A transcutaneous biopsy of a solid lung nodule was culture negative but identified the presence of intra-cellular budding yeast with no detectable capsule. Fontanna-Masson stain was positive indicating the presence of melanin in the cell wall, a feature seen in pathogenic cryptococci representing phenoloxidase production. Molecular evaluation using two separate targeted cryptococcal PCRs and panfungal ITS1/2 PCR were also negative. The confirmation of cryptococcal infection was established through immunohistochemical (IHC) testing using mAb471, mAb302 and mAbF10F5 on fixed formalin, paraffin embedded tissue (FFPE) from the lung biopsy.

Historically, minimally and non-encapsulated isolates have been thought to be non-virulent. With the development of new targeted molecular therapies for a range of different conditions, patients with relative immunosuppression will be more common, enabling infections from otherwise avirulent opportunistic pathogens. This case demonstrates the challenges of diagnosing infections with/by these unusual isolates and describes the use of non-traditional diagnostic methods that may be useful.

Ethical statement: Written consent for publication was obtained from the patient. All patient identifying information have been omitted from this publication.

17. Aspergillus vertebral osteomyelitis post autologous stem cell transplant for relapsed follicular lymphoma

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A 76-year-old male was diagnosed in 2017 with high-grade follicular lymphoma and received R-CHOP with complete metabolic response. In mid-2022 he relapsed, received R-ICE salvage and underwent autologous stem cell transplant in October 2022, complicated by neutropenic fevers thought related to enterocolitis. He was on fluconazole prophylaxis during this time.

In December 2022 he suffered progressive mid-thoracic back pain, MRI in January 2023 demonstrating T11/T12 vertebrodiscitis. Over the next two months he underwent two separate biopsies of the vertebra and disc demonstrating acute on chronic inflammation, but bacterial, fungal and mycobacterial culture negative. Vancomycin and ciprofloxacin were commenced following the first biopsy. In March a mass-like opacity was identified in the left lower lung lobe. Biopsy demonstrated non-specific fibrosis without fungal elements, however specimen was not available for culture.

Despite broad spectrum antibiotics he had persistent pain and progression of vertebrodiscitis from T7-L1. Panfungal DNA was retrospectively requested on the second vertebral body tissue (2 March) which was negative, however serum *Aspergillus* galactomannan collected on 29 March was detected (level 4.9). Subsequently *Aspergillus* DNA was detected in both tissue and blood.

He was commenced on amphotericin, changed to oral voriconazole 150mg BD and transferred to a peripheral hospital, planned for at least 6 months.

Aspergillus vertebrodiscitis is uncommon but increasingly reported in the immunocompromised host with 11% cases in haematological malignancies. Overall, data lacks to standardise management regarding anti-fungal choice, duration and surgical indications. Our case also highlights the role of non-culture techniques in diagnosis and management of atypical infections.

Ethical statement: Patient's name and identifying details have been withheld. Work has been written only on Canberra Health Services infrastructure and not shared outside of authors and organisers.

18. Invasive fungal infections in siblings with chronic granulomatous disease associated with antimicrobial prophylaxis non-adherence.

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Chronic granulomatous disease (CGD) is an inborn error of immunity characterized by the inability of phagocytes to destroy certain bacteria and fungi, resulting in life-threatening infections. The use of prophylactic antimicrobials can significantly increase life expectancy and haematopoietic stem cell transplant can provide definitive cure for patients with CGD. Here, we describe the case of two sisters, aged 6 years and 8 years, with a severe phenotype of CGD, who each acquired multiple synchronous fungal infections in the context anti-fungal prophylaxis non-adherence.

Both patients had multifocal pneumonia and soft tissue infections diagnosed on clinical and radiological grounds, with microbiological diagnoses including *Phaeoacremonium parasiticum*, *Scedosporium apiospermum* complex and *Didymella* species. A review of the literature has revealed three cases of *P. parasiticum* infection and two cases of *S. apiospermum* in patients with CGD, whilst there is limited literature describing *Didymella* species as a pathogen in humans. The sisters' case has been complicated by ethical challenges relating to medication adherence and parental reluctance to engage with available treatment options.

This case exhibits the spectrum of pathogens that can cause disease in patients with CGD and highlights the importance of antifungal prophylaxis. It also touches upon important ethical considerations when managing paediatric patients with chronic disease.

Ethical statement: The author has no conflicts of interest to declare.

ASID-ANZMIG Mycology Award Winners

Each year at the ASID Annual Scientific Meeting, a prize is awarded for the best mycology related poster or oral presentation. The prize includes registration, accommodation and flights to attend the next Mycology Masterclass. Recent winners who are in attendance at MMCX are:

Dr Shio Yen Tio (2023)
Dr Caitlyn Sun (2022)
Dr Lucy Crawford (2021)

Dr Shio Yen Tio is an ID physician with The Peter MacCallum Cancer Centre and Northern Health. In addition to general ID, Shio Yen is also interested in infections in immunocompromised hosts, in particular invasive fungal infections. She is currently a PhD candidate with the University of Melbourne/ Peter MacCallum Cancer Centre, examining the role and impact of longitudinal surveillance of invasive mould infections in healthcare institutions, in the context of construction works. Outside work, she loves to spend time with her little one, picking up and studying different types and shapes of pebbles outdoor. She hopes that one day she will be able to contribute her medical knowledge to developing countries/ under-privileged parts of the world, whilst still continue to learn from the experts around her whom she has had the privilege to work with.

Dr Caitlyn Sun is a Microbiology Registrar at SA Pathology, Royal Adelaide Hospital. She is currently in her third year of Infectious Diseases and Microbiology training.

Dr Lucy Crawford is a Clinical Microbiologist and Infectious Diseases Physician at SA Pathology, Royal Adelaide Hospital with an interest in mycology diagnostics, HIV and disadvantaged population health. She has worked in the Northern Territory and South Australia and is completing a Masters of Global Health Policy through the University of London School of Hygiene and Tropical Medicine.

David Ellis Oration

The David Ellis Oration started in 2015, to honour the contributions of Associate Professor David Ellis to mycology over the course of his career, which included founding the Mycology Masterclass and ANZMIG. Past speakers have been:

Prof. Tania Sorrell (2015)
Prof. Bart Currie (2017)
Prof. Lee Berger (2019)

In 2023, the David Ellis Orator is **Dr Teresa Lebel**. Teresa is a Senior Botanist and Curator of Cryptogams for the South Australian State Herbarium. She completed her PhD at Oregon State University, and has worked with the CSIRO, and Royal Botanic Gardens of Victoria before moving to Adelaide. Over the course of her career Teresa has described over 20 new genera and 130 species of macrofungi, developed identification tools and educational resources, and mentored undergraduate student interns, graduate students and citizen scientists in the study of fungi. She provides an on-call service to the Poisons Information Centre of Victoria & Western Australia for expert fungal identifications, providing assistance in cases of ingestion of potentially poisonous fungi. Teresa's current projects include analysing truffle-like fungal genomes and describing their taxonomy, the invasive potential of exotic fungi, use of native mammal fecal pellets as fungal inoculum in restoration sites, investigating chemical profiling of mushroom toxins, and the intriguing interactions between complex communities of plants (Chenopodiaceae), galling midges (Asphondylinae), microfungi (food source for larvae) and parasitoid wasps.

Delegate List

LAST NAME	FIRST NAME	ORGANISATION	STATE
Abajo	Teresa	Alfred Health	VIC
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Bhanot	Gautam	Canberra Health Services	ACT
Blakiston	Matthew	MedLab Central	NZ
Brell	Nadiya	The Wollongong Hospital	NSW
Cabang	Joey	National University Hospital	Singapore
Claassens	Anders	Loam Bio	NSW
Colaco	Clinton	Westmead Hospital	NSW
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Crawford	Simeon	Royal Prince Alfred Hospital	NSW
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Sundac	Lana	QLD Health	QLD
Tan	Yen Ee	Singapore General Hospital	Singapore
Tang	Helen	St Vincent's Hospital, Sydney	NSW
Tio	Shio Yen	Peter MacCallum Cancer Centre	VIC

LAST NAME	FIRST NAME	ORGANISATION	STATE
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