We are delighted to welcome you to the Spring 2015 Issue of the Asia Fungal Working Group Newsletter. The Asia Fungal Working Group (AFWG) organized another successful regional Medical Mycology Training Network meeting in 2014, which was attended by more than 70 physicians and microbiologists from across Asia, including China, Hong Kong, Indonesia, Philippines, Singapore, Malaysia, Taiwan and Thailand. The Medical Mycology Training Network encapsulated a key goal of the AFWG – to raise the standards of diagnosis and management of invasive fungal infections (IFIs) in the Asia-Pacific region through education and experience sharing, particularly pertaining to the unique challenges in this region. Through a two-day program of plenary lectures, workshops and multidisciplinary panel discussions, the meeting covered a wide range of fundamental topics, from the identification of pathogenic fungi to the selection of antifungal agents and the management of challenging IFIs. The AFWG is pleased to be expanding the Medical Mycology Training Network in 2015, bringing the meeting series to individual countries where education is needed – starting with Indonesia, Malaysia and Philippines. Our aim is to extend education through sustainable programs at a local level, so patients across Asia can be given the best management in the local setting.

The AFWG also continues to make steady congress in research collaborations across Asia. The retrospective Asia-Mold Study is being carried out to collect data on invasive mold infections from 5 centers in Asia. Data on the demographics, epidemiology, clinical status, treatment practices and outcomes of the patients are being analyzed, with the aim to provide better understanding of the epidemiology and clinical determinants of invasive mold infections across Asia.

This issue brings you a variety of article types highlighting current updates and practices in the management of IFIs. Our EVENT HIGHLIGHT briefly reviews AFWG’s involvement in the recent Fungal Academy meeting. As knowledge building and experience sharing are cornerstones of our vision, we are delighted with the increasing opportunities to collaborate in education programs, which will pave the way towards further improving IFI diagnosis and management across the region.

Selecting appropriate antifungal strategies and agents for patients requires an individualized approach, taking into consideration multiple factors, such as the patient’s underlying risks, site of infections and the properties of available antifungal agents. The CASE STUDY reminds us that antifungal prophylaxis can be useful in neutropenic patients with hematologic diseases to prevent IFIs, but careful consideration of local trends and resistance patterns are crucial before prescribing prophylactic therapy. The CLINICAL SUMMARY highlights a recent study showing increasing incidence of candidemia in Taiwan and the trends in outcomes of these patients. For practical guides in diagnosis and management, the PRACTICAL PERSPECTIVES provides a useful guide to the use of fluconazole for invasive candidiasis for practicing physicians, and the RECOMMENDATIONS FOR MYCOLOGY LABORATORY provides a protocol for improving the yield of fungal isolation from biopsy, tissue and lymph-node specimens.

We hope you enjoy this issue of the Asia Fungal Working Group Newsletter and find the offerings both interesting and valuable to your practice.
Fungal Academy 2015

The Fungal Academy was held in Bangkok, Thailand, from 24-25 January 2015 to discuss the latest developments in the diagnosis and management of IFIs. The speaker faculty comprised a panel of highly respected experts in the field of infectious disease and mycology from Asia as well as from the Netherlands and USA. The meeting successfully achieved a vast regional reach, with more than 100 participants from 10 Asian countries.

Fungal Academy 2015 had a comprehensive program that covered important aspects in the diagnosis and management of IFIs, including the trends and threats of fungal pathogens in the Asia Pacific, latest updates in the diagnosis of invasive aspergillosis, strengths and weaknesses of antifungal agents, clinical application of antifungal therapeutic drug monitoring, strategies in managing IFIs in high-risk patients, and integrated clinical pathways to individualize IFI management. Four members of the AFWG committee provided scientific inputs as speakers and facilitator to make the meeting a very engaging learning experience for all participants.

Professor Arunaloke Chakrabarti (co-chairman, AFWG) chaired the Fungal Academy and opened the meeting with a lecture on ‘Know your enemy: Emerging threats of fungal infections in the Asia-Pacific region’. He described the challenging situation in the Asia-Pacific region, with increasing incidences of invasive candidiasis, invasive aspergillosis and mucormycosis, alarming rates of fungal rhinosinusitus and keratitis in agrarian countries as well as new and emerging pathogenic fungi and parafungi. Education and resources to improve the diagnosis and management of fungal infections are urgently needed to address some of the prevailing challenges in the region. Throughout the meeting, Professor Chakrabarti used his experience to encourage dynamism and facilitate interactive discussions between the speakers and the participants.

Dr Tan Ban Hock (co-chairman, AFWG) gave a lecture to address the question, ‘Is there an ideal antifungal agent fulfilling patients’ needs?’ He reviewed the strengths and limitations of currently available antifungal treatment options, and discussed the considerations for treatment selection for different patients.

Professor Yee-Chun Chen (committee member, AFWG) addressed the latest issues in fungal diagnosis in her talk, ‘How can we improve the diagnosis of invasive aspergillosis?’ She highlighted novel fungal biomarker assays that hold promises of supporting integrated diagnostic and treatment strategies for invasive aspergillosis.

In an interactive workshop session, Dr Porpon Rotjanapan (committee member, AFWG) and Professor Johan Mouton facilitated spirited discussions and addressed the practical issues on how to apply antifungal therapeutic drug monitoring in clinical management to optimize treatment outcomes.

With a respected speaker faculty and comprehensive program, the Fungal Academy provided a valuable platform for knowledge updates and practical experience sharing for Asian doctors, making it a very successful and impactful event in the field of fungal infections.
AML and the high risk of multiple infectious complications

Dr Porpon Rotjanapan
Attending Physician
Faculty of Medicine Ramathibodi Hospital
Mahidol University
Bangkok, Thailand

Background and diagnosis

A 54-year-old man presented with complaints of low-grade fever and malaise that persisted for 2 weeks. Evaluation of his medical history did not reveal any significant medical conditions. Initial investigations into the patient’s complete blood count detected elevated total white blood cell (WBC) count of 120,000 cells/μL with 80% blast cells. These findings led to a diagnosis of acute myelogenous leukemia (AML).

Management

The patient was started on a chemotherapy regimen consisting of cytarabine and idarubicin. Immediately following the first course, the patient’s fever began to trend downwards.

This changed on Day 3 of the treatment cycle, when the patient's temperature spiked to 39.2°C. He also developed small, shallow oral ulcers, which tested negative for cytomegalovirus (CMV) and for herpes simplex virus (HSV) by polymerase chain reaction (PCR). The patient was then prescribed cefepime for neutropenic fever.

On Day 5, the patient developed diarrhea, losing around 750 mL per day. A stool examination did not detect the presence of red blood cells, WBC or pathogens like bacteria or fungi. A PCR test further confirmed that there was no Clostridium difficile present in the stool samples. However, blood cultures detected Enterococcus faecium. His antibiotic regimen was subsequently switched to empirical treatment with imipenem and vancomycin.

However, his temperature continued to peak on Day 9 post-chemotherapy, reaching 40.2°C, while his symptoms of diarrhea worsened, with a daily stool volume of 2,000 mL. The blood culture test was repeated, after which the patient had fluconazole added to treatment.

The patient’s high fever and symptoms of diarrhea persisted on Day 11. Results of the blood culture test showed budding of yeasts, identified as Candida tropicalis. Antifungal treatment was subsequently switched from fluconazole to anidulafungin.

By Day 16 of the treatment cycle, the patient’s diarrhea had improved slightly. However, the fever persisted within the range of 39.0 to 40.0°C. A computed tomography (CT) scan of his chest and abdominal regions detected diffuse thickening of the small bowel and ascending colon wall, although there were no signs of lung parenchymal abnormalities. Another blood culture was scheduled.

He became hypotensive on Day 17, with systolic blood pressure levels dropping to the 70’s mmHg range. The blood culture test reported the growth of gram-negative bacteria, later identified as Acinetobacter baumannii. Given the high rates of multidrug resistance associated with the bacteria, colistin was added to treatment.

The patient’s final anti-infectious treatment regimen for the infections was adjusted to include: imipenem, amikacin, daptomycin, ganciclovir, anidulafungin, intravenous immunoglobulin and granulocyte-colony stimulating factor. The patient’s fever finally subsided on Day 22 post-chemotherapy and he was discharged 5 days later.

This case illustrates the morbidity associated with candidemia in patients who receive remission induction therapy for AML. Clearly this patient only received antibacterial coverage in the beginning of the treatment course for a concern of high likelihood of gastrointestinal bacterial translocation causing infectious complications. However, considering data on microflora in the gastrointestinal tract, the human body harbors not only bacteria, but fungi, particularly Candida spp., which are prominent residents. This potentially indicates that gut bacteria as well as fungi are able to cause severe infections especially in this setting.

A large number of randomized controlled trials have been performed and the data as a whole indicate that antifungal prophylaxis does reduce the incidence and mortality of IFI in patients with chemotherapy-induced neutropenia. For example, in a meta-analysis in cancer patients who received chemotherapy for hematologic malignancies or underwent hematopoietic stem-cell transplantation, antifungal prophylaxis reduced all-cause mortality. However, when 24 studies that included only patients with acute leukemia where analyzed, the reduction in mortality was only borderline significant (relative risk 0.88, 95% confidence interval 0.74 to 1.06). In terms of prophylaxis treatment choice, fluconazole reduced 30-day mortality significantly but not end-of-follow-up mortality. Prophylaxis with itraconazole did not reduce all-cause mortality. Another meta-analysis in neutropenic patients with hematologic malignancies showed that prophylaxis with itraconazole did not reduce all-cause mortality. Another meta-analysis in neutropenic patients with hematologic malignancies showed that prophylaxis with itraconazole did not reduce all-cause mortality. However, when 24 studies that included only patients with acute leukemia where analyzed, the reduction in mortality was only borderline significant (relative risk 0.88, 95% confidence interval 0.74 to 1.06). In terms of prophylaxis treatment choice, fluconazole reduced 30-day mortality significantly but not end-of-follow-up mortality. Prophylaxis with itraconazole did not reduce all-cause mortality. Another meta-analysis in neutropenic patients with hematologic malignancies showed that prophylaxis with itraconazole did not reduce all-cause mortality.

Managing risk of infections in AML: Key points

- AML patients are at risk of bacterial and fungal infections due to their compromised immune systems; these infections are major causes of morbidity and mortality in neutropenic patients.
- Prophylactic antifungal and antibiotic therapies are key to preventing bacterial and fungal infections.
- A review of randomized AML trials concluded that antifungal prophylaxis reduced fungal infection-related mortality and IFIs.
- Consider local infectious trends and drug-resistance patterns before prescribing prophylactic anti-infectious treatment.

References:
A hospital’s experience with candidemia and empirical therapy

Chen PY, Chuang YC, Wang JT, Sheng WH, Yu CJ, Chu CC, Hsu PR, Chang SC, Chen YC.

Candidemia in Taiwan

Candidemia is associated with high mortality, prolonged hospital stay and greater medical costs.\(^1\,^2\) Since the 1990s, Taiwanese hospitals have instituted empirical antifungal therapy (amphotericin B or fluconazole) for high-risk patients and pushed for greater physician awareness. Despite the policy, the incidence of candidemia continues to be high in Taiwan; Candida was the leading pathogen of healthcare-associated infections in intensive care units (ICUs) in 2010.\(^3\) Several reasons for the rising incidence were offered: there are more at-risk patients, extensive application of invasive procedures and devices, advancements in life support and prescription trends in favor of broad-spectrum antimicrobial agents and aggressive chemotherapy.\(^4\)

A retrospective look

A retrospective analysis was conducted in a 2,300-bed Taiwanese teaching hospital to determine disease-specific incidence of candidemia and the impact of empirical therapy on patient outcomes. The analysis focused on 2002 and 2010 records of all hospitalized patients with Candida colonization. Parameters assessed were:\(^4\):

- demographic characteristics
- clinical characteristics
- distribution of Candida spp.
- length of hospital stay before candidemia
- length of ICU stay at onset of candidemia
- time-to-initiate systemic antifungal therapy
- antifungal regimen
- 30-day crude mortality and in-hospital mortality.

Characteristics of patients with candidemia

There were more cases of candidemia in 2010 than 2002, with an incidence density of 0.41 versus 0.34 per 1,000 patient-days, respectively (p=0.04). This incidence, as noted by researchers, was higher than in the United States, Europe or Australia. While there are no clear indications why the incidence rose in 2010, researchers have noted that characteristics of the patient population were a major consideration. More than one-third of patients in 2010 had one or more neoplasms.\(^4\)

Comparing patients with candidemia in 2002 and 2010, patients in the latter year were:\(^4\):

- older (p<0.001)
- had a higher Charlson co-morbidity index, which indicates the severity of underlying diseases (p<0.001)
- more likely to have chronic pulmonary diseases, moderate-to-severe renal diseases, leukemia, lymphoma, and gastrointestinal malignancies (p<0.001) as underlying illnesses.

Risk factors

A subsequent multivariate analysis determined the predominant risk factors for candidemia in 2010, as tabled below:\(^4\):

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Odds ratio (95% confidence interval)</th>
<th>p value</th>
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</thead>
<tbody>
<tr>
<td>Age(^*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-12 months</td>
<td>3.67 (1.50-8.97)</td>
<td>0.004</td>
</tr>
<tr>
<td>45-64 years</td>
<td>2.18 (1.42-3.30)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt;65 years</td>
<td>2.64 (1.72-4.06)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Chronic pulmonary diseases</td>
<td>1.90 (1.25-2.89)</td>
<td>0.003</td>
</tr>
<tr>
<td>Moderate-to-severe renal diseases</td>
<td>8.08 (6.11-10.67)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>3.98 (2.49-6.35)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Leukemia</td>
<td>4.58 (2.90-7.23)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gastrointestinal malignancy</td>
<td>2.80 (1.93-4.05)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Metastatic solid tumor</td>
<td>2.32 (1.72-3.14)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*20-44 years as reference

The impact of empirical antifungal therapy

More patients in 2010 received antifungal therapy on the same day or 1 day after infection onset (41.2% vs 27.5% in 2002, p=0.002). However, shorter time-to-initiation of antifungal therapy did not appear to improve outcomes. The overall 30-day mortality rate remained high (45.9% in 2002 and 44.4% in 2010), even in patients who received therapy early. This finding was concordant with two recent reports.\(^5\,^6\) The authors’ ongoing prospective observational study showed that patients with higher severity of illness at onset of candidemia (defined by APACHE II scores) were more likely to receive antifungal therapy earlier and empirically. However, the majority of patients were treated with fluconazole (manuscript in preparation). Antifungal therapeutic guidelines in Taiwan have been updated in 2009 (published online in 2010).\(^7\) The guidelines recommend that echinocandins are the drug of choice in selected populations, such as patients with moderate-to-severe invasive candidiasis.\(^7\)

Interestingly, the 30-day mortality rate was worse among patients without antifungal therapy in 2010 compared with 2002 (66.67% vs 39.39%, p=0.03), which supports researchers’
assertions that patients in 2010 were sicker and may have died prior to confirmation of diagnosis.

References:

Key conclusions
• The incidence of candidemia appears to be increasing in one Taiwanese teaching hospital in 2010, compared with 2002.
• More patients presenting in this hospital appear to be at risk of Candida infection in 2010 than in 2002.
• The 30-day mortality rate in 2010 appears unchanged since 2002, although more patients received antifungal therapy within one day of infection onset.
• For patients with poor underlying conditions, the authors highlighted the use of echinocandins, a class of antifungal agent with fungicidal activity, in selected patients.

PRACTICAL PERSPECTIVES

Fluconazole in 2015: A quick reference for practicing clinicians

Dr Atul K Patel
Infectious Diseases Clinic
Vedanta Institute of Medical Sciences
Ahmedabad, India

Candidemia is associated with very high morbidity and about 40% mortality. In a recent study from India, candidemia was associated with 44.7% mortality in non-neutropenic patients in the ICU.¹ The introduction of fluconazole revolutionized the therapy of Candida infections in the 1990s by offering a well-tolerated alternative to amphotericin B, which has significant associated toxicity. Fluconazole is widely used in India. Despite recommendations of echinocandin use in ICU patients, 64% of patients in ICU were treated with fluconazole and 6.2% of Candida isolates were resistant to fluconazole.³

Fluconazole remains an attractive option for treatment of candidiasis because of its excellent oral bioavailability, safety and clinical efficacy. Echinocandins have reported good efficacy and safety in critically ill patients with candidemia. Clinicians practicing in resource-limited settings are still using older antifungal agents such as fluconazole and amphotericin B deoxycholate for candidemia despite the availability of echinocandins in those countries. This article will discuss important pharmacological parameters of fluconazole that can help clinicians get maximum benefits out of fluconazole.

Spectrum of activity
Fluconazole is active against Candida species, including C. albicans, C. tropicalis, C. parapsilosis, C. lusitaniae and C. glabrata (up to 30-40% are resistant to azoles), as well as Cryptococcus neoformans, Histoplasma capsulatum, Coccidioides immitis.

Pharmacokinetic parameters
After oral administration, fluconazole is rapidly and fully absorbed (bioavailability >90%), with a time to maximum absorption of 0.5-1.5 h after intake of medication.

Fluconazole total clearance significantly increases when used in renal failure patients receiving continuous venovenous hemofiltration (CVVH) or continuous venovenous hemodialysis (CVVHD), requiring higher doses to achieve therapeutic drug levels and optimal antifungal activity.²,³ Data on fluconazole pharmacokinetics in adult patients on extracorporeal membrane oxygenation (ECMO) is not available. However, in infants on ECMO, similar clearance but higher volume of distribution are seen, thus, higher doses may be needed for treatment.⁴

Dosage recommendations
A loading dose of 12 mg/kg followed by 6 mg/kg/day in patients with normal renal function is recommended. Loading dose is required to reach steady state level within 24 hours.

Fluconazole is relatively well tolerated with daily dosage up to 2g/day. Dose/isolate minimum inhibitory concentration (MIC) ratio of >100 is associated with better outcomes in patients with candidemia.⁵
Suggested dosages in patients with renal impairment

- 50% dosage in patients with creatinine clearance of 10-50 mL/min
- Patients receiving hemodialysis: 100% dosage post-hemodialysis
- Patients receiving peritoneal dialysis: 50% dosage
- CVVH (fluconazole clearance 25 mL/min): 3-6 mg/kg/day
- CVVHD (higher fluconazole clearance 38 mL/min): 6-12 mg/kg/day
- CVVHDF: 12 mg/kg/day

CVVH, continuous venovenous hemofiltration; CVVHD, continuous venovenous hemodialysis; CVVHDF, continuous venovenous hemodiafiltration

Fluconazole therapeutic drug monitoring

Unlike voriconazole and posaconazole, routine fluconazole therapeutic drug monitoring (TDM) is not required due to linear pharmacokinetics and predictable drug levels. In patients receiving renal replacement therapy, TDM will help clinicians adjust fluconazole dosage for better clinical outcome.2,3

Clinically relevant drug-drug interactions in critically ill patients

Fluconazole inhibits the CYP3A4 isoenzyme responsible for the metabolism of a wide range of drugs (Table). It is also a strong noncompetetitive or mixed-type inhibitor of CYP2C9 and CYP2C19.

**Table. Important drug-drug interactions with fluconazole in ICU patients**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Interaction mechanism</th>
<th>Effect(s) of interaction</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glimepiride6</td>
<td>Inhibition of CYP2C9</td>
<td>Glimepiride AUC increased by &gt;100% and Cmax increased by &lt;100%</td>
<td>Monitor for glimepiride toxicity and adjust dose if necessary</td>
</tr>
<tr>
<td>Midazolam7-10</td>
<td>Inhibition of CYP3A4</td>
<td>Midazolam AUC increased by &gt;100% and Cmax increased by &lt;100%</td>
<td>Monitor for toxicity of midazolam and adjust dose if necessary</td>
</tr>
<tr>
<td>Omeprazole11</td>
<td>Inhibition of CYP2C19 and CYP3A4</td>
<td>Omeprazole AUC increased by &gt;100% and Cmax increased by &lt;100%</td>
<td>Monitor for toxicity of omeprazole and adjust dose if necessary; upon initiation of therapy, start with low dose of omeprazole</td>
</tr>
<tr>
<td>Phenytoin12</td>
<td>Inhibition of CYP2C9</td>
<td>Phenytoin AUC increased by &lt;100%</td>
<td>Monitor for toxicity of phenytoin and adjust dose if necessary; perform TDM of phenytoin</td>
</tr>
<tr>
<td>Fentanyl13</td>
<td>Inhibition of CYP3A4</td>
<td>Fentanyl AUC increased by &lt;100%</td>
<td>Monitor for toxicity of fentanyl</td>
</tr>
<tr>
<td>Warfarin14</td>
<td>Inhibition of CYP3A4 and CYP2C9</td>
<td>Warfarin AUC increased by &lt;100%</td>
<td>Monitor for toxicity of warfarin</td>
</tr>
</tbody>
</table>

AUC, area under the plasma drug concentration-time curve; Cmax, maximum concentration; TDM, therapeutic drug monitoring

Important toxicities associated with fluconazole

Generally fluconazole is well tolerated even at a higher dosage of 1.2 to 2 mg/day. Occasionally, reversible alopecia and transaminitis are observed. Fatal hepatotoxicity, hypokalemia and central nervous system side effects such as headache and dizziness are rare.

Summary

Fluconazole is a valuable treatment option for patients with invasive candidiasis. Careful attention to drug-drug interactions and dose adjustment, according to MIC of isolates and renal replacement treatment status of patients, will help clinicians achieve better clinical outcomes in patients with candidemia.

References:
Protocol for processing of biopsy, tissue and lymph node specimens for fungal isolation

Prepared by Dr Evelina N Lagamayo
Edited by the AFWG committee

1. Why do I need this protocol:
   To increase culture yield rate

2. General recommendations

<table>
<thead>
<tr>
<th>Collection and container</th>
<th>Sterile container with 1 mL of sterile NSS or BHI broth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing</td>
<td>1. Cut tissue into small pieces (1 mm²) or mince on sterile petri dish with sterile scalpel blade and homogenize in sterile tube with sterile NSS/BHI broth.</td>
</tr>
<tr>
<td></td>
<td>- If non-septate hyphae are observed, avoid grinding the tissue.</td>
</tr>
<tr>
<td></td>
<td>- If septate hyphae are observed, cut/mince tissue into smaller pieces to increase the chance of isolation of the fungi.</td>
</tr>
<tr>
<td></td>
<td>2. Inoculate the homogenate as well as the small pieces of minced tissue on appropriate agar plates (1x BHIA plate, 2x SDA plates and 1x SDA plate containing cycloheximide and chloramphenicol).</td>
</tr>
<tr>
<td></td>
<td>3. Label plates accordingly and incubate until 30 days.</td>
</tr>
<tr>
<td>Media and incubation temperatures</td>
<td>• Incubate the BHIA and 1x SDA (no antibiotics) plates at 35°C.</td>
</tr>
<tr>
<td></td>
<td>• Incubate 1x SDA plate (no antibiotics) and 1x SDA plate (with antibiotics) at room temperature (25-27°C).</td>
</tr>
</tbody>
</table>

NSS, normal saline solution; BHI, brain heart infusion; BHIA, brain heart infusion agar; SDA, Sabouraud dextrose agar.

3. Special considerations

<table>
<thead>
<tr>
<th>Corneal scrapings</th>
<th>Inoculate directly on culture media</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the tissue is hard</td>
<td>In addition to mincing, a tissue grinder or sterile glass beads can be used with sterile NSS or distilled water; vortex for a few seconds before inoculating on appropriate culture media.</td>
</tr>
<tr>
<td>If mucormycosis-causing species is suspected</td>
<td>Inoculate tissue directly on SDA plate after mincing with a sterile scalpel blade. Avoid grinding the tissue.</td>
</tr>
</tbody>
</table>

NSS, normal saline solution; SDA, Sabouraud dextrose agar.

Note: This protocol is a guideline for increasing the yield of fungal isolation from specimens. Any laboratory can apply or use any other media as options, such as blood agar.
UPCOMING EVENTS

<table>
<thead>
<tr>
<th>DATE</th>
<th>CONFERENCE</th>
<th>VENUE</th>
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<tbody>
<tr>
<td>4-8 May 2015</td>
<td>19th Congress of the International Society for Human and Animal Mycology</td>
<td>Melbourne Convention and Exhibition Centre, Melbourne, Australia</td>
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<td>(ISHAM 2015)</td>
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<td>(ISAAR 2015)</td>
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<tr>
<td>7-11 June 2015</td>
<td>6th Congress of European Microbiologists (FEMS 2015)</td>
<td>MECC Maastricht, Maastricht, The Netherlands</td>
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<tr>
<td>31 July-2 August 2015</td>
<td>5th Annual World Congress of Microbes (WCM-2015)</td>
<td>Pullman Shanghai South, Shanghai, China</td>
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<tr>
<td>17-21 September 2015</td>
<td>Interscience Conference of Antimicrobial Agents and Chemotherapy (ICAAC)</td>
<td>San Diego Convention Center, San Diego, USA</td>
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<tr>
<td></td>
<td>and the International Congress of Chemotherapy (ICC) 2015</td>
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<td></td>
<td>Abstract submission and travel grant application open until 21 May 2015</td>
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<tr>
<td>9-12 October 2015</td>
<td>Trends in Medical Mycology (TIMM 2015)</td>
<td>Lisboa Congress Center, Lisboa, Portugal</td>
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<td></td>
<td>Abstract submission and travel grant application open until 1 June 2015</td>
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</table>

Join us in the **MYCOSIS IN ASIA** session at the ISHAM Congress

**17.30–19.00 • Tuesday, 5 May 2015**

MR103, Level 1, Melbourne Convention and Exhibition Centre, Australia

Experts from Asia, including committee members of the AFWG, will be providing perspectives on how to meet the growing challenges of fungal infections in Asia.

**AGENDA**

Co-chairs: Yee-Chun Chen and Porpon Rotjanapan

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Speaker</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.30</td>
<td>The epidemiology and susceptibility of invasive yeast infections:</td>
<td>He Wang, China</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5-year national surveillance in China</td>
<td></td>
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<tr>
<td>17.45</td>
<td>Rare fungal infections: What we should know?</td>
<td>Ruoyu Li, China</td>
<td></td>
</tr>
<tr>
<td>18.00</td>
<td>Changing epidemiology of dermatophytosis</td>
<td>Pei-Lun Sun, Taiwan</td>
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<tr>
<td>18.15</td>
<td>Pythiosis: Asian focus</td>
<td>Ariya Chindamporn, Thailand</td>
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<tr>
<td>18.30</td>
<td>Updates on penicilliosis</td>
<td>Liyan Xi, China</td>
<td></td>
</tr>
<tr>
<td>18.45</td>
<td>Mucormycosis: Is it different in Asian countries?</td>
<td>Arunaloke Chakrabarti, India</td>
<td></td>
</tr>
</tbody>
</table>