11th ANNUAL

FUNGAL UPDATE

Abstract Book & Programme

Friday 5th & Saturday 6th February 2016
The Great Hall, St Bartholomew's Hospital

Chairs:
Professor Malcolm Richardson (University Hospital of South Manchester)
Professor Antonio Pagliuca (King's College Hospital, London)

Organising Committee

Dr. Samir Agrawal

Prof. Rosemary Barnes

Dr. Gemma Johnson

Dr. Rohini Manuel

Prof. Nick Read

Dr. Mark Wilks

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Welcome

Dear Colleagues,

On behalf of the organising committee, it gives me great pleasure to welcome you to the 11th Annual Fungal Update in the Great Hall at St. Bartholomew's Hospital.

Following on from the great success of last year's 10th anniversary meeting, we have assembled a programme which promises to deliver further valuable insights, education and updates.

The topics on day one will explore antifungal stewardship programmes in different settings, which are a challenge to implement, yet such programmes offer significant clinical and financial benefits. The scientific session is cutting-edge with insights on fungal pathogenesis and identifying new fungal targets for diagnosis and treatment. The cases, as always, will challenge your knowledge with real clinical dilemmas, while the academic among you will enjoy the evening quiz – a new feature last year, which was tremendous fun.

On day two we will hear about diagnostic strategies, novel imaging probes for aspergillus-specific detection by CT-PET and updates on the EORTC-MSG criteria for invasive fungal diseases, NEQAS and fungal diagnostics and the literature highlights from 2015. The keynote lecture is a new addition and is likely to become a permanent feature of the meeting.

While keypad voting promotes participation, I would really like to encourage you to reflect on the issues in hand and to ask questions of the speakers at Q&A time.

As always with such meetings, to ask others to give up their time requires one thing – an excellent programme. I hope this 11th Annual Fungal Update achieves this.

Dr. Samir G. Agrawal BSc, FRCP, FRCPath, PhD
Senior Lecturer and Honorary Consultant, Barts Health NHS Trust
& Blizard Institute, Queen Mary University of London.

Programme: Friday 5th February 2016

Chairs: Professor Antonio Pagliuca (King's College Hospital, London)
Professor Malcolm Richardson (University Hospital of South Manchester)

10:20 – 10:30
Welcome from Dr. Samir Agrawal on behalf of the organising committee

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Implementing stewardship programmes

10:30 – 11:10
Fungal infections in paediatrics – the National Antifungal Stewardship Programme in Paediatrics
Prof. Adilia Warris, Principal Investigator, Aberdeen Fungal Group, University of Aberdeen

11:10 – 11:50
Antifungal stewardship in ICU
Dr. Eavan Muldoon, Consultant in Infectious Diseases, University Hospital of South Manchester

11:50 – 12:30
Antifungal stewardship in haemato-oncology
Prof. Patricia Muñoz, Division of Clinical Microbiology and Infectious Diseases, Hospital General Universitario Gregorio Marañón, Madrid, Spain

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12:30 – 13:40
Lunch break and view sponsor stands

Scientific Sessions

13:40 – 14:20
Nutritional immunity and fungal pathogenesis
Dr. Duncan Wilson, Research Fellow, Aberdeen Fungal Group, University of Aberdeen

14:20 – 15:00
Gene profiling for new biomarkers for Aspergillus
Dr. Sharleen Braham, Clinical Scientist, King's College Hospital, London

15:00 – 15:40
From bench to drug discovery - fungal pathogenicity and target identification for A. fumigatus
Dr. Mike Bromley, Lecturer, Institute of Inflammation and Repair, University of Manchester

15:40 – 16:00
Tea break and view sponsor stands

Case Presentations (including keypad voting)

16:00 – 16:30
Is there Candida in the fluid? A cluster of cases in solid organ recipients
Dr. Inês Ushiro-Lumb, Lead Clinical Microbiologist for Organ Donation and Transplantation, NHS Blood and Transplant, London

16:30 – 17:00
Fungal headaches from Barts Health – get your thinking caps on!
Dr. Jonathan Lambourne, Consultant in Infectious Diseases, Barts Health NHS Trust

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17:00 – 18:40
Break – check-in at hotel (as appropriate)

Reception and Dinner at Crowne Plaza London - The City Hotel

18:45 – 19:00
Reception

19:00 – 19:40
Mycology quiz
Chaired by Prof. Chris Kibbler, Professor of Medical Microbiology, University College London

19:45 – 22:00
Dinner

Programme: Saturday 6th February 2016

08:50 - 09:00
Introduction from the Chairs – summary of Friday sessions

Fungal diagnostics - clinical practice and research

09:00 – 09:40
The Austrian experience: PCR, GM, BDG, LFD, CT and BAL (plus the kitchen sink!)
Dr. Martin Hoenigl, Infectious Diseases and Tropical Medicine, Medical University of Graz, Austria

09:40 – 10:20
Beyond the halo sign – towards pathogen identification using CT-PET
Prof. Dr. Clemens Decristoforo, Radiopharmacist, Univ.Klinik f.Nuklearmedizin, Innsbruck, Austria

10:20 – 10:45
Updating the EORTC/MSG criteria for invasive fungal diseases - inclusion of PCR
Dr. P. Lewis White, Principal Clinical Scientist, Public Health Wales Microbiology, Cardiff

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10:45 – 11:05
Tea break and view sponsor stands

11:05 – 11:30
National quality assurance for fungal diagnostics
Shila Seaton, Bacteriology Scheme Manager, UK NEQAS for Microbiology, Public Health England

11:30 – 11:50
Top papers and TIMM highlights - 2015
Dr. Rohini Manuel, Consultant Clinical Microbiologist, Public Health England, London

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Keynote Speaker

11:50 – 12:35
Global impact of fungal disease and the challenges ahead
Prof. David Denning, Professor of Infectious Diseases in Global Health, The University of Manchester

12:35
Summing up and close by the Chairs

Speaker Biographies and Abstracts

Dr. Samir Agrawal – Chair of the Organising Committee

Senior Lecturer in Haematology, Queen Mary University of London and Consultant Haemato-Oncologist at Barts Health NHS Trust

Dr Agrawal qualified initially at the University of Bristol and subsequently trained at The Royal Marsden Cancer Hospital, being awarded his PhD (in Immunology) at the University of Paris. He is a fluent French speaker.

He is former Director of The Stem Cell Laboratory and Head of Diagnostic Immunophenotyping. He has designed, funded, and implemented studies on myelodysplastic syndromes, invasive aspergillosis, and chronic lymphocytic leukaemia. He is a member of the UK CLL trials committee and trustee for CLLSA (the patient-led support organisation for patients in the UK with CLL), as well as a NICE reviewer and the Haemato-Oncology representative on the UK IVIg initiative.

His current activities in the field of invasive fungal disease are:

- A proposal for a study in high-risk haematology patients looking at delivering rapid fungal diagnostics nationally
- Developing clinical guidelines for managing IFD in the high-risk haemato-oncology setting
- Promoting best practice and highlighting new developments through educational meetings and a new website for all interested in fungal disease, including the GAIN initiative.
- Member of the ECIL guidelines group
- Member of the fungal subgroup of government committee on antimicrobial resistance, ESPAUR.

Professor Antonio Pagliuca – Meeting Co-Chair

Clinical and Transplant Director / Haematopoietic Stem Cell Transplantation, King's College Hospital, London

Antonio Pagliuca is Clinical Professor of Stem Cell Transplantation at King's. After pre-clinical training in Cambridge he completed his clinical and research training in London, and took up the post of Consultant Haematologist and Honorary Senior Lecturer at King's College Hospital, London in 1994. He is the Divisional Clinical Director of Haematology.

Professor Pagliuca's department at King's College Hospital has one of the largest adult unrelated and cord transplant programmes in the UK and, under his direction, has been designated as a Centre of Excellence by Leukaemia and Lymphoma Research. He has published widely in the field of haematological malignancies, stem cell transplantation and infections in this group of patients.

Professor Pagliuca has participated in Department of Health expert working groups and is Chair of the Royal College of Physicians/Royal College of Pathologists Intercollegiate Committee for Haematology. He was President of the British Society of Blood and Marrow Transplantation and is a board member of the British Society of Haematology. In 2013, he was appointed as the Chair of the Department of Health BMT Clinical Reference Group, for the NHS.

Professor Malcolm Richardson – Meeting Co-Chair

Director of the Mycology Reference Centre, University Hospital of South Manchester

Malcolm Richardson is Director of the Mycology Reference Centre, University Hospital of South Manchester, and has an affiliate appointment at the University of Manchester as Professor of Medical Mycology. His clinical and laboratory investigations over 42 years have focused on the diagnosis, pathogenicity, and epidemiology of superficial and systemic fungal infections. More recently he has applied his diagnostic experience to investigating the impact of indoor moulds on human health. In recognition of this he has recently been elected as President of the UK Institute of Specialist Surveys and Engineers.

He has published over 380 original articles, book chapters and reviews and is the author or editor of fifteen mycological textbooks and handbooks, including: The Pocket Guide to Fungal infection, 3rd Edition (2006), Therapeutic Guidelines in Systemic Fungal Infection, 4th Edition (2007), Fungal Infection and Critical Care Medicine (2008) and Fungal Infection: Diagnosis and Management, 4th Edition (2012).

Professional duties have included being Editor-in-Chief of Critical Reviews in Microbiology (2008-2014), and acting as an advisor to the World Health Organisation, and the European Food Safety Authority. In June 2012 Malcolm Richardson was elected as President-Elect of the International Society for Human and Animal Mycology (ISHAM) (2012-2015) and took up the position of ISHAM President in May 2015. He is an advisor for the Global Action Fund for Fungal Infections (GAFFI) and the LIFE (Leading International Fungal Education) Programme. Malcolm Richardson is an enthusiastic teacher and is closely involved with the University of Manchester Masters in Medical Mycology.

Professor Adilia Warris

Principal Investigator, Aberdeen Fungal Group, University of Aberdeen

Professor Adilia Warris is a principal investigator of the Aberdeen Fungal Group at the University of Aberdeen, a paediatric infectious diseases specialist with a specific interest in medical mycology and holds an Honorary Consultant position in Paediatric Infectious Diseases at the Royal Aberdeen Children's Hospital. Prof Warris' specific areas of interest include the host-fungus interaction in specific patient groups with an emphasis on Aspergillus species, the unique interaction of A. nidulans and the CGD host, Aspergillus infections in the cystic fibrosis (CF) host, the development of new management strategies for invasive fungal infections (IFI) in children, the epidemiology of IFI in children, and the pharmacology of antifungals in paediatrics.

In 2014 Dr Warris launched, and now Chairs, the European Paediatric Mycology Network (EPMyN) which aims to improve the management and understanding of paediatric fungal infections. She coordinates the European Society of Clinical Microbiology Infectious Diseases – European Society of Fungal Infections Group (ESCMID–ESFIG) working group which is developing the management guideline for invasive aspergillosis in children. Dr Warris is also an author of the ECIL-4 Guidelines for Diagnosis, Prevention and Treatment of Invasive Fungal Diseases in Paediatric Patients with Cancer or Allogeneic Haematopoietic Stem Cell Transplantation. She has organised and contributed to numerous international post-graduate courses in the field of medical mycology and paediatric infectious diseases in general. She is a member of the editorial board of the Medical Mycology Case Reports journal and has published over 100 peer-reviewed papers and contributed to several book chapters both nationally and internationally.

Abstract: Fungal infections in paediatrics – towards a national Paediatric Antifungal Stewardship Programme

The need for a national paediatric antifungal stewardship (AFS) programme is directly related to the challenges encountered in the management of invasive fungal infections (IFI) in neonates and children, the development of antifungal resistance, and the high costs of inappropriate antifungal prescriptions. Apart from differences in underlying conditions relative to adults, paediatric patients are unique regarding their epidemiology, the usefulness of non-culture-based microbiological tests and the pharmacology of antifungal agents. Optimal management of IFI in the paediatric population is hampered by poor-sensitivity of non-culture-based microbiological tests, lack of knowledge of indication specific dosing and monitoring of antifungal therapy, and the lack of paediatric specific guidelines.

IFI are characterised by unspecific signs and symptoms in already extremely vulnerable children (e.g. low birth weight neonates, children with primary immunodeficiencies or malignancies, and those receiving haematopoietic stem cell transplants) and the pressure to start antifungal treatment early due to the high morbidity and mortality of these infections. Most antifungals in paediatric settings are therefore prescribed for empiric/pre-emptive therapy. To successfully develop and implement a national paediatric AFS programme, evaluation and identification of current gaps in resources and knowledge among healthcare workers involved in the diagnosis and treatment of IFI in neonates and children is a key step.

Dr. Eavan Muldoon

Consultant in Infectious Diseases, National Aspergillosis Centre, University Hospital of South Manchester

Eavan Muldoon is a graduate of University College Dublin. She completed her Specialist registrar training in Infectious Diseases and General Internal Medicine in the Republic of Ireland. Following this she travelled to the United States and completed a fellowship in Infectious Diseases in Tufts Medical Center, Boston, where she was the inaugural recipient of the Francis P. Tally Fellowship in Infectious Diseases and received the Kass award for Clinical Excellence. She joined the National Aspergillosis Centre in August 2013.

She was awarded a Doctor of Medicine (MD) by Trinity College Dublin in 2011. Her thesis was entitled 'Syphilis and HIV co-infection in Dublin; Strategies to enhance diagnosis, investigation and management'. She graduated from Tufts University, Boston with a Masters in Public Health in 2013.

Her clinical and research interests include antibiotic stewardship, outpatient parenteral antimicrobial therapy (OPAT) and transplant infectious diseases.

Abstract: Antifungal stewardship in the ICU

The incidence of invasive fungal infection (IFI) in the Intensive Care Unit (ICU) is increasing. These infections have a significant associated morbidity and mortality. Early and appropriate management improves patient outcomes. However, many of the diagnostic tests available have poor sensitivity, and/or long turnaround times, meaning empirical antifungal agents are often initiated and continued for prolonged periods. This talk will focus on antifungal stewardship approaches which can be utilised in the ICU to ensure early and appropriate treatment of potential IFI, and discontinuation of antifungal agents promptly where it has been ruled out.

Professor Patricia Muñoz

Division of Clinical Microbiology and Infectious Diseases, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Patricia Muñoz, MD, PhD is Professor of Medicine in Clinical Microbiology at the Complutense University of Madrid and Head of the infectious disease section in the Division of Clinical Microbiology and Infectious Diseases at the Hospital General Universitario Gregorio Marañón.

Dr Muñoz's main research interests include fungal infections, infective endocarditis, infections in solid organ transplant recipients, immunocompromised hosts, heart surgery patients and nosocomially-acquired infectious diseases. She has published more than 400 papers, books, and book chapters. Dr Muñoz has contributed to current prophylactic strategies against Pneumocystis carinii and toxoplasmosis in heart transplant recipients, to the understanding of lung nodules, to the identification of risk factors for invasive aspergillosis and targeted prophylaxis, and to the awareness of human herpesvirus 8 infection in transplant recipients. At present she is working in developing an antifungal stewardship program and in the clinical application of fungal biomarkers.

Dr Muñoz is a member of the Spanish Society for Clinical Microbiology and Infectious Diseases, the American Society for Microbiology, and the European Society for Clinical Microbiology and Infectious Diseases (ESCMID). She is an active member of the European Study Group for Nosocomial Infections the ESCMID Study Group of infection in compromised host (ESGICH) and the Spanish Network of Infection in Transplantation, and is the Secretary of the Group for the Management of Infective Endocarditis of the Gregorio Marañón Hospital (GAMES). And recently she has been named as President of the Spanish Society for Cardiovascular Infections (SEICAV).

Abstract: Antifungal stewardship in haemato-oncology

During recent years, inappropriate antifungal use has contributed to the global increase in antifungal resistance and has played a role in the shift in the aetiology of invasive fungal infections. Moreover, overuse of antifungals may also lead to higher toxicity associated with unnecessary medication exposure and to increased healthcare costs. Antifungal stewardship (AFS) programmes consist of multidisciplinary interventions, usually led by specialists in infectious disease, microbiology and pharmacy that cooperate and communicate with the major prescribing departments in order to optimise antifungal therapies evaluating the indication, dose, streamlining and duration.

We will review the available evidence for the use of AFS, the special case of haematology departments and their impact on health economics. We also describe our AFS programme, the successive steps we followed and the main difficulties we found.

Dr. Duncan Wilson

Research Fellow, Aberdeen Fungal Group, School of Medical Sciences, University of Aberdeen

I studied Microbiology at the University of Glasgow, carried out my PhD on Candida albicans molecular biology at the University of Manchester and Pfizer before moving to the Hans Knoell Institute, Jena, Germany to work on C. albicans host-pathogen interactions.

I have now secured a Wellcome Trust Sir Henry Dale Fellowship to establish my own group at the University of Aberdeen. My group is interested in how pathogenic fungi compete with their hosts for essential micronutrients. Certain trace minerals, such as iron and zinc, are actively withheld from pathogens in a process called nutritional immunity. Therefore, pathogenic microbes must have evolved specialised uptake systems in order to proliferate in their hosts and cause disease. I am using a combination of molecular and cellular biology, together with models of host-pathogen interactions, to dissect the mechanisms of micronutrient assimilation by the major human fungal pathogen, Candida albicans. I am particularly interested in the molecular mechanisms of zinc scavenging by this fungus during interactions with host cells.

Abstract: Nutritional immunity and fungal pathogenesis

Certain trace metals, such as zinc, are essential for the growth and development of virtually all organisms including pathogenic microbes, and the hosts they infect. Our mammalian immune systems have evolved sophisticated mechanisms to withhold these micronutrients from potential invaders in a process known as nutritional immunity. In spite of this defence mechanism, pathogens still thrive and cause disease. Therefore, pathogenic microbes have, in turn, evolved mechanisms to circumvent nutritional immunity. Despite the fundamental importance of this host-pathogen “tug-of-war”, its underlying mechanisms, and how they can be exploited to prevent disease remain poorly understood. Candida albicans is a dominant fungal pathogen of humans and is responsible for both superficial, as well as life-threatening disseminated infections.

We are exploring how C. albicans secures the essential micronutrient zinc from its human host, and how this essential, yet potentially toxic cation is mobilised within the fungal cell. Tolerance of fungal cells to elevated environmental zinc requires functional vacuolar zinc import and is associated with both vacuolar and endosomal (“zincosome”) zinc accumulation. Under zinc limitation, the fungus relies on either transporter-mediated uptake, “zincophore”-mediated zinc scavenging or mobilisation of intracellular reserves. Here I will discuss the mechanisms of fungal micronutrient homeostasis within the context of nutritional immunity.

Dr. Sharleen Braham

Clinical Scientist, Department of Microbiology, King's College Hospital/Viapath, London

Dr Braham gained a BSc in Biomedical Sciences from Kingston University and an MSc and PhD in infectious diseases from The London School of Hygiene and Tropical Medicine.

Current research interests of Dr Braham include informative diagnosis of invasive fungal infection for clinical benefit.

Abstract: Gene profiling for new biomarkers for Aspergillus

Invasive fungal infection remains a risk to immunocompromised patients. Serological and molecular assays are useful for the detection of Aspergillus in clinical settings. However, the presence of nucleic acid does not distinguish between non-invasive and invasive Aspergillosis (IA). There is a need for more informative assays for distinguishing between IA and the presence of non-invasive aspergillus to provide improved, targeted patient management.

This presentation will demonstrate the progress of recent research work for the specific detection of IA.

Dr. Mike Bromley

Lecturer, Institute of Inflammation and Repair, University of Manchester

Mike Bromley is a Lecturer in Drug Discovery at the Manchester Fungal Infection Group. He works on the mechanistic basis of fungal pathogenicity with the translational emphasis of developing novel antifungal agents. Whilst working for F2G Ltd, a University of Manchester spin-out company, Mike made a major contribution to the identification of potential drug targets in A. fumigatus and to advancing these discoveries through the target validation process. His research team discovered and exploited mobilisable genetic elements in A. fumigatus which facilitated discovery of numerous essential genes. Several gene products have subsequently been validated as novel drug target candidates.

Mike's team has also developed high-throughput gene replacement strategies for A. fumigatus and chemical genetic screens to identify the mechanism of action of antifungal agents. He is the co-ordinator of the €6.1M FP7 collaborative research program (NOFUN) which is identifying and validating further drug targets and developing novel antifungal compounds from early stage hits through the drug discovery pipeline.

Abstract: From bench to Drug Discovery - Fungal Pathogenicity and Target identification for A. fumigatus

Fungal diseases are estimated to kill between 1.5 and 2 million people each year, which exceeds global mortality estimates for either tuberculosis or malaria. Of these around 15% are attributable to invasive mould infections predominantly caused by Aspergillus fumigatus. Only four classes of antifungal agent are available to treat invasive fungal infections and all suffer pharmacological shortcomings including toxicity, drug-drug interactions and poor bioavailability. There is an urgent need to develop a new class of drugs that operate via a novel mechanism of action.

A critical aspect of drug discovery is target identification and validation. In this presentation I explore the various rational approaches that have been used to identify novel drug targets in pathogenic fungi. Particularly I will present our successes and failures in employing a variety of genetic, genomic as well as biochemical approaches including transposon mutagenesis, chemical genomics, transcriptional profiling and phenotypic profiling. I present analysis of drug targets identified through our efforts and show why we believe they may provide a route to the next generation of antifungal agents.

Dr. Inês Ushiro-Lumb

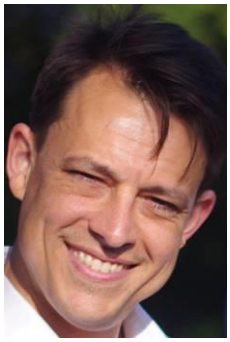
Lead Clinical Microbiologist for Organ Donation and Transplantation, NHS Blood and Transplant, London

Dr Ushiro-Lumb has been a Consultant Medical Virologist in London since 2001. She joined NHS Blood and Transplant in 2012 where she is the Lead Clinical Microbiologist for Organ Donation and Transplantation. She is also a Consultant Virologist in the Virus Reference Division, Public Health England, and London.

She chairs the Infection Group of the Notify Project, a WHO initiative for the Global Vigilance and Surveillance for Transplantation and assisted reproduction; she is member of the UK Advisory Panel for Healthcare Workers infected with blood-borne viruses and the UK Standing Advisory Committee on Transfusion-Transmitted Infection.

Case Presentations: Is there Candida in the fluid? A cluster of cases in solid organ recipients

Dr. Jonathan Lambourne



Consultant in Infectious Diseases, Barts Health NHS Trust, London

Dr Lambourne completed his PhD at St George's University of London, identifying mannose-binding lectin deficiency as a risk factor for invasive aspergillosis.

His particular interests are in infections in the immunocompromised, infections in the returning traveller and the evaluation of techniques to increase the diagnostic hit-rate in these patient groups.

Case Presentations: Fungal headaches from Barts Health – get your thinking caps on!

Professor Chris Kibbler

Professor of Medical Microbiology, University College London

Chris has been a member of the European Organisation for Research and Treatment of Cancer-Invasive Fungal Infections Group (EORTC-IFIG) Steering Committee and has also been Chair of the UK National Advisory Committee on Fungal Infection, Chair of the UK Clinical Mycology Network and a member of the European Conference on Infections in Leukaemia (responsible for producing the ECIL guidelines for the management of these infections).

Professor Kibbler is Past President of the British Society for Medical Mycology and Programme Director of the BSMM/UCL International MSc/Diploma in Medical Mycology.

His research interests include infections in the immunocompromised host and mycology, especially diagnostic, therapeutic, and pathogenic aspects of infections caused by Candida and Aspergillus species.

Dr. Martin Hoenigl

Infectious Diseases and Tropical Medicine, Medical University of Graz, Austria

Martin Hoenigl, M.D., is a young investigator from the Section of Infectious Diseases and the Division of Pulmonology, Medical University of Graz, Austria.

As part of his career plan at the Medical University of Graz he is currently working as a postdoctoral fellow at the Division of Infectious Diseases of the University of California, San Diego (UCSD), while he continues his work as the principal investigator in a number of studies in the field of medical mycology at his home university. He is author to 89 pub med listed publications in the field of infectious diseases, the majority in leading authorships (i.e. first or last author) and has particular expertise in conducting research on fungal diagnostics and pharmacology of anti-mycotic drugs and correlation with clinical findings.

Dr. Hoenigl has been awarded with the Researcher of the year 2011 award at the Medical University of Graz, and with the Research Promotion award 2014 of the German Speaking mycological society. He serves as an associate editor for Mycoses, the vice-president of the Austrian society for Medical Mycology, the Austrian delegate in the European Confederation of Medical Mycology (ECMM), and the Young Ambassador of Austria in the American Society for Microbiology (ASM).

Abstract: The Austrian experience: PCR, GM, BDG, LFD, CT and BAL (plus the kitchen sink!)

Invasive fungal infections (IFI) and in particular invasive mould infection (IMI) remain an important cause of morbidity and mortality among patients with hemato-oncological malignancies and other immunocompromised patients. In particular aspergillosis is the leading cause of IMI in this group of patients, however, closely followed by emerging moulds like Mucorales and Fusarium spp.

Due to the crude mortality of more than 90% in absence of adequate treatment, timely diagnosis and early start of antifungal therapy are key factors in the successful treatment of IMI. Diagnosis of IMI, however, remains difficult as clinical signs and symptoms as well as radiological findings are often unspecific, in particular in non-neutropenic patients, and conventional culture methods lack sensitivity.

In recent years antigen testing has therefore become one of the cornerstones of IMI diagnostics. Serum and bronchoalveolar lavage (BAL) galactomannan (GM) testing may detect invasive aspergillosis, whereas serum ß-D-Glucan (BDG) testing may also detect other invasive fungal infections. However, both tests result negative in Mucorales infections and have several other limitations including sensitivity and specificity issues, as well as prolonged turnaround-time. Consequently, improved diagnostic markers are urgently needed. Multifungal and Aspergillus specific PCR assays and the Aspergillus Lateral-Flow-Device (LFD) test have been shown to be promising methods for detection of fungal infection in immunocompromised patients.

Professor Dr. Clemens Decristoforo

Radiopharmacist, Univ.Klinik f.Nuklearmedizin, Innsbruck, Austria

Prof. Clemens Decristoforo is a Radiopharmacist at the Department of Nuclear Medicine of the Medical University Innsbruck, Austria. He studied Pharmacy and did his PhD in 1997 at the Leopold Franzens University Innsbruck. In 1997-1998 he was a Post-Doc Marie Curie Research Fellow at the Nuclear Medicine Research Lab at St. Bartholomew's Hospital, London and 2009-2010 he worked as radiopharmaceutical Scientist at the International Atomic Energy Agency in Vienna. In 2014 he was awarded honorary Professorship of the Medical University Innsbruck.

He chaired for many years the Radiopharmacy Committee of the European Association of Nuclear Medicine, is member of Expert Group 14 of the European Pharmacopeia (EDQM, Strasbourg) and member of several Editorial Boards. His research interests are focussed on radiometals and peptides for molecular imaging and therapy - in this field he has published more than 100 scientific papers.

Abstract: Beyond the halo sign – towards pathogen identification using CT-PET

Invasive Aspergillosis (IA) is a major cause of morbidity and mortality in immunocompromised patients and is a substantial driver of elevated healthcare costs in Europe. Early diagnosis is a key issue, however current diagnostic approaches have major limitations and new molecular imaging tools are urgently needed.

In the pathophysiology of Aspergillus fumigatus (A.f.) iron plays an essential role during infection. A.f. employs a specific and highly efficient iron transporter mechanism based on iron binding siderophores that are upregulated in A.f. and essential for A.f. during infection. By exchanging iron for the radionuclide Gallium-68 (68Ga), specific iron carriers, so called siderophores, can be radiolabelled and visualized in vivo by the use of Positron Emission Tomography (PET). In particular Desferritriacetylfusarenine C (TAFC) showed excellent radiolabelling properties resulting in highly pure compounds, but also very high uptake by Aspergillus, which was in particular highly dependent on iron supply. In a rat-model of IA it could be shown that 68Ga-TAFC were retained in infected lungs dependent on severity of infection with so far unreported high uptake values in infected lung tissue. Using micro-PET technique we were able to image the development of disease and the extension of infection in lung tissue as well as to determine optimal imaging time points. We also compared the uptake of 68Ga-labelled TAFC and other siderophores in different microorganisms, whereby TAFC showed advantages in being more specific especially regarding bacterial infections. It also could be shown that a high iron load, which often occurs in the clinical setting of immunocompromised patients, did not significantly reduce the uptake of these new compounds in infected tissue.

Overall these preclinical results demonstrated that this PET technique has the potential for highly sensitive detection of IA in patients and combines it with CT, currently used for diagnostic imaging of IA. Clinical translation of this approach is planned.

Dr. P. Lewis White

Principal Clinical Scientist, Public Health Wales Microbiology, Cardiff

Dr P. Lewis White has been a Principal Clinical Scientist in Public Health Wales Microbiology, Cardiff, for over 15 years. He specialises in mycobacteriology and molecular biology, but his main focus is Mycology. He is currently the Scientific Lead of the Regional Mycology reference lab, responsible for the local implementation of diagnostic driven approaches for the management of invasive fungal disease (IFD), resulting in both a reduction in the incidence of disease and a significant reduction in the use of unnecessary antifungal therapy.

Dr White has extensive research experience in developing, evaluating, standardising and implementing molecular technologies to aid in the diagnosis of IFD and is a founder member of the European Aspergillus PCR Initiative, an international organization involved in standardizing PCR technology for the diagnosis of IFD. He is also a member of the European Organization for Research and Treatment of Cancer (EORTC) - Infectious Disease Group involved in the redrafting of the EORTC/MSG definitions for the diagnosis of IFD.

Currently, Dr White is involved in multicentre pan-European clinical trials to determine the benefit of diagnostic-driven approaches for the management of IFD, and is involved in studies attempting to stratify patients according to clinical and genetic risk factors. He has published extensively in the field of molecular diagnosis of IFD and in 2007 Dr White was shortlisted for NHS Healthcare Scientist of the Year in Research and Development.

Abstract: Updating the EORTC/MSG criteria for invasive fungal diseases - inclusion of PCR

PCR to aid diagnosis of invasive aspergillosis (IA) has been used for over two decades, but is not included in the European Organisation for the Research and Treatment of Cancer/Mycoses Study Group (EORTC/MSG) definitions of invasive fungal disease, a result of limited standardization. Methodological recommendations for PCR are now available and the EORTC/MSG definitions are under further review. Which begs the question how does PCR compare with the other laboratory tests already included in the definitions?

Through systematic literature review analytical and clinical information for PCR was identified and compared to galactomannan-EIA and β-D-Glucan, to provide an objective baseline when considering PCR.

PCR, by design, can provide the greatest analytical specificity. The sensitivity and specificity for Aspergillus PCR are comparable to that for Galactomannan-EIA and β-D-Glucan for the diagnosis of IA. PCR Clinical utility is comparable with galactomannan-EIA, yet superior to β-D-Glucan for IA. All tests have unique limitations, but to date only PCR has been excluded.

The evidence available for PCR is at least equivalent to that for galactomannan-EIA and β-D-Glucan testing, and PCR is ready for inclusion in the EORTC/MSG definitions.

Ms. Shila Seaton

Bacteriology Scheme Manager, UK NEQAS for Microbiology, Public Health England

Shila Seaton is a Principal Health Care Scientist and Bacteriology Scheme Manager at UK NEQAS. She served 24 years in the NHS, initially in a routine diagnostic microbiology laboratory as a state registered Biomedical Scientist, and then as a Clinical Scientist specialising in medical mycology.

Her research was predominantly focused on the diagnosis of invasive aspergillosis in immunocompromised patients using serological and molecular techniques. She has co-authored many mycology related diagnostic publications over the past 20 years.

Since 2009, she has been employed by UK NEQAS, and has played a key role in developing a UK NEQAS scheme for galactomannan after leading on a user survey in 2015. She is an author on external quality assessment schemes in a prospective new Oxford Textbook for Medical Mycology.

Abstract: National quality assurance for fungal diagnostics

Laboratory services play a crucial role in both individual and population based healthcare. The prime objective of laboratory medicine is the reporting of accurate and timely test results to the requesting clinician. Laboratory tests are used to:

- determine the clinical status of a patient
- diagnose infection and disease states
- evaluate progress of disease
- monitor response to treatment

Whenever a health professional requests a laboratory test for fungal diagnosis, the result is expected to be accurate, reliable and timely. However, this may not always be the case: diagnosis of invasive fungal disease is challenging because current diagnostic methods may lack sensitivity, specificity and results in many cases provided too late for any clinical use, a key risk factor for patient outcome.

To assure results determined by the various traditional and emerging methodologies, implementation of quality assurance (QA) is paramount. QA is the total process whereby the quality of laboratory results, from specimen collection, pre analytical testing and post analytical reporting of results, can be guaranteed.

All clinical diagnostic laboratories, accredited to ISO 15189 are strongly advised to integrate QA procedures as part of maintaining professional standards of service and the need for comparability of results, which requires good QA practices and the complementary discipline of external quality assessment (EQA) as imperative.

The ultimate goal is the timely detection of the causative agent, allowing administration of appropriate treatment and improved outcome for the patient. Participation of clinical diagnostic laboratories in quality assessment programs will support the delivery of accurate and precise test results and the quality in the diagnosis of a fungal infection.

Dr. Rohini Manuel

Consultant Clinical Microbiologist, Public Health England, London

Dr Manuel is a Consultant Medical Microbiologist at the PHE Public Health Laboratory London, an honorary Consultant Microbiologist at Barts Health NHS Trust and honorary Senior Clinical Lecturer at Queen Mary University of London. She is also a member of the RCPath London Regional Council, an advisor to RCPath Consulting, and the public health champion for the North Thames NIHR Clinical Research Network in Infectious Diseases and Microbiology.

Rohini's main interests are in gastrointestinal infections and diseases, particularly those affecting immunocompromised individuals. Her specialist area of expertise is mycology and she is a member of the UK Clinical Mycology Network Steering Group. She is appointed to the Food Standards Agency's Advisory Committee on Novel Foods and Processes, and the clinical lead for the London regional Clostridium difficile Ribotyping Network (CDRN) service. She sits on the Board of Examiners for the British Society for Medical Mycology / UCL MSc in Medical Mycology, and is an Editor for the newly commissioned Oxford Textbook in Medical Mycology.

In 2014, she was awarded PHE Pipeline Fund to evaluate and lead the Barts Health / QMUL / PHE Triple Invasive Aspergillosis Diagnostic Testing (TRIADx) service.

Abstract - Interesting papers and TIMM 2015 highlights

My talk will include presentations from TIMM 2015 that I found interesting from a clinical, diagnostic or therapeutic perspective. Particular highlights include the revised EORTC / MSG guidelines on IFIs, the diagnostics and clinical challenges posed by chronic pulmonary aspergillosis, and fungal infections in the ITU setting.

I will also briefly discuss the latest drug to join the antifungal armamentarium, isavuconazole, which was approved by both the FDA and European Commission in 2015.

Professor David Denning

Professor of Infectious Diseases in Global Health, The University of Manchester; Director, National Aspergillosis Centre, University Hospital of South Manchester; President, Global Action Fund for Fungal Infections

David Denning is an internationally recognised clinician with expertise in fungal diseases. He manages the UK's National Aspergillosis Centre in Manchester, the world's only such centre. David Denning has published more than 500 papers, books and book chapters and lectures worldwide. His writings have been cited over 40,000 times. He has successfully led many major international collaborative science, diagnostic and treatment projects and clinical guidelines, with subsequent publication in Nature, the New England Journal of Medicine and the Lancet. He is the Founder of 2 University spinout biotechnology companies – F2G Ltd (antifungal drug discovery and development) and Myconostica Ltd (molecular diagnostic tests for fungi), now sold to Lab21. He is Chairman of the Editorial Board of The Aspergillus Website (1998-) with over 1 million pages read per month. He has chaired the Scientific Committees of several international fungal infection meetings, and co-chairs the alternate year Advances Against Aspergillosis meetings, attracting ~400 delegates for >120 countries. He is President of the Global Action Fund for Fungal Infections which has a mission to greatly improve outcomes from fungal infections, through greater understanding of the burden of fungal diseases, advocacy for universal access to fungal diagnostic testing and antifungal therapies, and enhancing clinical skills through education.

Abstract: Global Impact of Fungal Disease and the challenges ahead

Estimates of the global burden of serious fungal diseases place the main burden in 3 categories: Potentially life-threatening infections in AIDS (cryptococcal meningitis, Pneumocystis pneumonia and disseminated histoplasmosis), life-threatening infection in hospitalised and immunocompromised patients (invasive candidiasis and aspergillosis and mucormycosis) and chronic debilitating lung infections and allergies ('fungal asthma' and chronic pulmonary aspergillosis after TB). Deaths from fungal infection in AIDS is estimated to exceed 700,000, nearly 50% of the total AIDS deaths.

Recently major improvements in diagnostics allow earlier diagnosis and better therapy, even discontinuing unnecessary antibacterial and antifungal therapies. There is a major need build capacity and expertise in this area, to reduce deaths, pressure towards antibacterial and antifungal resistance and to reduce ill-health. Adequate and well established antifungal agents have been available since the 1960's (amphotericin B), 1970's (flucytosine) and 1990's (fluconazole and itraconazole), yet the first 2 are unavailable in many countries. As GDP grows, so countries will have increased cancer treatment rates, and consequent fungal infections, increased diabetes and asthma, and increasing rates of Pneumocystis pneumonia.

The potential impact of improved access to fungal diagnostic tests and antifungal therapy will be illustrated by reference to reducing deaths in AIDS. If at least 60% of the 35 million HIV population has access to fungal diagnosis and therapy by 2020, conservative estimates of reduced deaths from cryptococcal disease, Pneumocystis pneumonia, disseminated histoplasmosis and chronic pulmonary aspergillosis are a fall from 220,500 to 163,000, from 260,000 to 97,500, from 80,000 to 32,000 and from 56,000 to 22,500 respectively, a cumulative total of 1,642,000 people, typically in their 30's.

Notes

Additional Information and Resources

To keep up to date with information about Fungal Update, please visit the meeting website below.

www.fungalupdate.org

You will now find video podcasts of the sessions from last year's 10th Annual Fungal Update on the website. The video podcasts of the sessions from this year's Fungal Update will be published on the website in the near future too.

Announcements about future meetings and activities will also be made through the website, so please add it to your favourites for future reference. We hope that you find it useful.

For further information or enquiries, please email the Fungal Update organising team:

organisers@fungalupdate.org