

EXPERT
REVIEWS

Third Advances Against Aspergillosis Meeting 2008

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Third Advances Against Aspergillosis Meeting 2008
Miami Beach, FL, USA, 16–19 January 2008

On 16–19 January 2008, the Third Advances Against Aspergillosis Meeting took place in Miami Beach, FL, USA. There were 351 registrants from 26 countries. The two earlier meetings had taken place in San Francisco, CA, 2004 and in Athens, Greece, 2006, and the series has become the place for scientists and clinicians to be updated on developments relevant to all aspects of this fungal genus.

A Scientific Committee (of 17 members) assembled 60 invited speakers and 100 posters for the meeting. The first 3 days began at 7:30 am and ended at 9:30 pm! The fourth day was a truncated one, enabling participants to depart that evening. In providing an account of an exhaustive meeting such as this, it is difficult to provide an overview that does justice to its breadth. We have tried to give the highlights of each speaker's presentation, grouped by topic covered, which shows what the Scientific Committee considered to be the currently important issues in each area. Owing to space considerations, we could not cover important material presented in the posters but only focus on speaker presentations. Poster abstracts are however, available on the *Aspergillus* website [1]. For those readers interested in a particular topic within the meeting, one of the meeting's byproducts is the production of a supplement, containing almost all of the papers presented, and for the 2008 meeting this will be published by *Medical Mycology* (K Clemons, Guest Chief Editor). For readers interested in a specific talk mentioned, the author's name in full and the full title are in the program posted on the website [2], thus opening the possibility of direct contact by a reader of this report with any presenter.

The meeting opened with two overviews, as a result of audience suggestions at the 2006 Athens meeting, in an attempt to orient the diverse backgrounds of the attendees for the specific presentations to follow. The stated mission of these meetings is to foster future collaborations across disciplines, particularly

aiming to join basic and clinical scientists. D Stevens (Stanford University, CA, USA) gave the keynote lecture 'Clinical aspergillosis for basic scientists', and Joan Bennett (Rutgers University, NJ, USA) followed with 'Molecular biology for clinicians'. Although the subsequent sessions more oriented to the basic sciences and those more oriented to the clinical sciences were interdigitated throughout, to now achieve a sense of the content of the meeting it may be more informative to review it in the context of the more basic science aspects first, and then move toward the more clinical talks, without regard to the sequence in which the papers were presented at the meeting.

In a Meet-the-Professor session, D Geiser (Pennsylvania State University, PA, USA) discussed the use of genomics to study molecular evolution and pathogenesis, as well as the role of fungal sexual structures. In the plenary meeting, R Samson (Centraalbureau voor Schimmelcultures, The Netherlands) reviewed *Aspergillus* taxonomy. N Federova (The Institute for Genomic Research, MD, USA) discussed genomic variations between isolates in the same species, cautioning that one isolate's genome on a chip cannot represent the universe of genomic variation in that species. A Balajee (US CDC, GA, USA) focused on the species described as '*Aspergillus terreus*', indicating that diversity within this species now needs to be regarded as a section and not a single species. C Klaasen (Canisius Wilhelmina Hospital, The Netherlands) addressed genotyping, contrasting multilocus sequence typing with microsatellite methodology.

A session was devoted to secondary metabolites. W Nierman (The Institute of Genomic Research, MD, USA) continued the theme of genomics and genes associated with secondary metabolite, their location and diversity. R Cramer (Montana State University, MT, USA) continued with the delineation of metabolic products, particularly gliotoxin. S Baker (Pacific Northwest National Laboratory, WA, USA) presented information on the genes involved in metabolic pathways, and also talked about metabolic flux modeling, an approach to model metabolism and predict the effects of genes on metabolites. J Frisvad (Technical University of Denmark, Denmark) concluded with a presentation on metabolomics, producing a profile of secondary metabolites.

The role of the fungal cell wall was covered by J Latgé (Institut Pasteur, France), discussing the diversity in galactomannans, H Horiuchi (University of Tokyo, Japan) on chitin's role, and M Warwas (Simon Fraser University, Canada) on sialic acid on the surface of fungal structures and its role in host cell binding of conidia. N Read (University of Edinburgh, UK) showed elegant films of hyphal development, demonstrating cytoplasmic flow patterns.

Aspergillus growth and pathogenicity was covered by R Amitani (Kyoto University, Japan), on the interface of the fungi with respiratory mucosa, and W Hope (University of Manchester, UK) on the invasion of lung epithelium, and the alveolus–capillary–endothelial cell interface. Hope described a system to study pneumocytes and methods whereby host cell–fungus interactions result in death. G Ramage (Glasgow Caledonian University, UK) addressed biofilm formation by *Aspergillus fumigatus*, how to study it and its clinical role. A Pasqualotto (Universidade Federal do Rio Grande do Sul, Brazil) concluded by covering the various species of *Aspergillus*, their pathogenicity and their toxic metabolites.

The translational aspects of the meeting began with illustrations of the applications of basic science tools to the clinic in diagnosis. Issues concerning diagnosis were addressed by D Perlin (UMDNJ–New Jersey Medical School, NJ, USA), on RNA as an alternative marker to use in diagnosis of aspergillosis; O Kniemeyer (Leibniz Institute for Natural Product Research and Infection Biology, Germany) on the use of the proteome to derive new markers in diagnosis; L Klingspor (Karolinska Institute, Sweden) on PCR in diagnosis and optimizing that technology; J Maertens (University Hospital Gasthuisberg, Belgium) on the development of diagnostic tools with high negative predictive value; F Marty (Harvard Medical School, MA, USA) on the utility of testing for glucan to make the diagnosis and the factors that impinge on that assay; and K Clemons (Stanford University, CA, USA), comparing methodologies for quantitating the fungal load. T Walsh (National Cancer Institute, USA) described imaging of infected experimental animals and S Vyas (Dr Harisingh Gour University, India) projected the use of nanocarriers in diagnosis.

The epidemiology of *Aspergillus* was addressed by D Haiduven (University of South Florida, FL, USA), who outlined infection control practitioners' risk assessment of hospital events (such as construction) that could result in increased exposures to patients,

and D Weber (University of North Carolina, NC, USA) presented the approach of the Healthcare Infection Control Practices Advisory Committee (HICPAC), a Federal advisory group, to this problem. A Terr (Terr Medical Corporation, CA, USA) discussed the 'sick building syndrome' and the controversy over the health effects of buildings with excessive mold growth.

Immune defenses against aspergillosis were updated by S Holland (National Institute of Allergy and Infectious Diseases, MD, USA), on leukocyte function in the congenital immunodeficiency, chronic granulomatous disease (CGD); D Yang (National Cancer Institute, MD, USA) on the role of alarmins, molecules that effect the transition between the innate and adaptive immune systems (including lactoferrin, neutrophil degranulation and epithelial secretion, and mediation of the recruitment of antigen-presenting cells); and T Hohl (Memorial Sloan Kettering Cancer Center, NY, USA) on the interface between macrophages and echinocandin antifungals, an interaction that appears to promote innate immune defenses, achieved by drug-induced effect on hyphae, exposing β -glucan and thus stimulating an inflammatory response. S Perkhofer (Medical University Innsbruck, Austria) discussed the effects of platelets on the cell wall and M Mircescu (Memorial Sloan Kettering Cancer Center, NY, USA) described experiments showing the effect of depleting myeloid subsets on host defenses. In a Meet-the-Professor session, L Romani (University of Perugia, Italy) stressed the importance of the indoleamine-pyrrole 2,3-dioxygenase (IDO) pathway and T-regulatory cells in dampening the inflammatory process. T Lehrnbecher (Johann Wolfgang University of Frankfurt, Germany) reported studies of stimulating T cells with antigen and studying their reactivity, T Zelante (University of Perugia, Italy) focused on IL-23 and IL-17 and their adverse effects on host defenses, and J Ito (City of Hope National Medical Center, CA, USA) concluded by reviewing the applications of immunology studies on vaccine development, particularly AspF3, in his laboratory.

The pathogenesis of aspergillosis in different host populations was addressed by B Segal (Roswell Park Center Institute, NY, USA), discussing CGD and the role inflammation plays in the disease process; S Husain (University of Pittsburgh, PA, USA), compared the picture in different solid organ transplant populations; and D Kontoyiannis (University of Texas MD Anderson Cancer Center, TX, USA) presented the steroid-treated patient (where fungal burdens may be lower than in other immunocompromised hosts).

A clinical Meet-the-Professor session was presided over by John Bennett (National Institute of Allergy and Infectious Diseases, MD, USA), G Sarosi (Indiana University, IN, USA) and L Mirels (Stanford University, CA, USA), who gave their approaches to puzzling clinical presentations.

There were several papers on the important entity of sinusitis. M Day (University of Bristol, UK) described the picture seen in dogs, and A Chakrabarti (Postgraduate Institute of Medical Education and Research, India) and R deShazo (University of Mississippi, MI, USA) each gave talks emphasizing the diversity of presentation in humans. M Schubert (University of Arizona,

AZ, USA) discussed the connection of sinusitis and asthma and the important manifestation of allergic mucin. Another problematic presentation of aspergillosis, CNS disease, was reviewed by S Schwartz (Charité – Universitätsmedizin Berlin, Germany).

The clinical side of immune reactivity to *Aspergillus* was the session on asthma and allergic bronchopulmonary aspergillosis (ABPA). S Wenzel (University of Florida, FL, USA) portrayed the different types of asthma (inflammatory and allergic) and the different therapies required. J Kolls (University of Pittsburgh, PA, USA) clarified the role of Th17 cells in ABPA, and the interface of ABPA with cystic fibrosis and heterozygotes for the cystic fibrosis gene. D Hartl (Ludwig–Maximilians University, Germany) gave the picture of the chemokine, TARC, which is a marker for and plays a role in ABPA. D Denning (University of Manchester, UK) also talked about the cystic fibrosis–ABPA connection, as well as clinical studies assessing the treatment of patients with fungal sensitization who do not meet the classic criteria of ABPA.

How can all this knowledge be applied to the advancing treatment of the patient? Vyas outlined the possible therapeutic applications of nanocarriers, N Weiderhold (University of Texas, TX, USA) reviewed the paradoxical effect of echinocandins (loss of

inhibition by drug at supra-inhibitory concentrations), P Verweij (University Medical Centre Nijmegen, The Netherlands) gave a current overview of resistance to azole drugs and J Lewis (University of Texas, TX, USA) reviewed the pharmacodynamics of antifungal drugs. M Kleinberg (University of Maryland, MD, USA) addressed the use of amphotericin B and prophylaxis issues. T Patterson (University of Texas, TX, USA) discussed host risk factors, especially in bone marrow transplant patients, the use of radiology and other diagnostic tools, and choosing initial therapy. P Chandrasekar's (Wayne State University, MI, USA) talk concerned prophylaxis and its limitations, N Singh (University of Pittsburgh, USA) discussed drug interactions and the immune reconstitution syndrome, and K Sepkowitz (Memorial Sloan Kettering Cancer Center, NY, USA) reviewed the problem of treatment failure. R Drew (Duke University, NC, USA) gave a presentation on newer delivery systems of antifungals, particularly aerosol delivery. E Anaissie (University of Arkansas, AR, USA) addressed clinical trial design and strategy, and the use of surrogate markers.

The next meeting in this series will take place in 2010 in Europe. Information will be available on the website [2].

References

Websites

- 1 *Aspergillus*/aspergillosis website
www.aspergillus.org.uk/indexhome.
htm?secure/conferences/confabstracts/
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- 2 Advances against Aspergillosis 2010
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