

Convocation

***Aspergillus* and aspergillosis—Progress on many fronts**

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The extraordinary nature of the genus *Aspergillus*, and associated disease, is well illustrated by the Advances Against Aspergillosis meeting in February 2006 and in this supplement. The spectrum of aspergillosis extends from allergy in the nose and sinuses to the lungs (manifesting in subtly different ways), to slowly progressive pulmonary or sinus destruction in apparently normal individuals (and other mammals and birds) and to immediately life-threatening infection in immunocompromised patients. No other microorganism has this range of infections and allergic syndromes associated with it.

Equally remarkable is the basic genomic structure and some facets of biology in the *Aspergillus* genus. Not only are about 40% of the genes from the three published genomes new to science, but these apparently close relatives are as distantly related as fish and man. Such huge evolutionary changes in the space of about 200 million years in an organism with 10,000–14,000 genes is quite remarkable. This probably explains in part the wide environmental comfort zone for the genus in many hostile locales, namely compost, high salinity environments (Dead Sea) and the vertebrate lung. Clearly this versatility can only be the result of sophisticated adaptation, while retaining the essential characteristics of the genus.

Of course, ingenious humans have learned to tame the fungus and turn it to good use. Domestication of *Aspergillus oryzae* a couple of thousand years ago has led to numerous foods and beverages of distinctive character in northeast Asia. In contrast, its aflatoxin-

producing relatives *A. flavus* and *A. parasiticus* remain far from tamed, found in huge quantities in food stuffs all over the underdeveloped world with major detrimental effects on growth, immune function and contributing to hepatic carcinoma in livestock and man. This remains a significant public health challenge.

This supplement is a testament to the remarkable advances in the subject since the millennium. We have completed genomes; we have new drugs; we have better definitions of disease; we have new allergens; we understand the interaction between *Aspergillus* and the immune system much more than previously; we have new species of *Aspergillus*. But we lack many things. Diagnosis of both allergy and invasive infection is still relatively rudimentary and slow. We don't know what most of the genes in the genomes do. We have less than five defined protein structures based on crystals. We don't know why *Aspergillus* can disseminate from the lung and why it localizes in the organs it does. We don't know whether to use one or more drugs for treatment. New patient populations with serious infection or allergy are being defined. And we still need new and better anti-*Aspergillus* drugs to cope with resistance failure and intolerance problems, especially oral drugs. These challenges require intensive investigation, often in a multidisciplinary context and needs education and networking opportunities. To help continue the advances we have already made, and forge new discoveries, the 3rd Advances Against Aspergillosis meeting will be held 16–19 January, 2008 in Miami, Florida (USA).