

A reflection on the 12th International Congress on Yeasts

Kyiv, Ukraine, August 11-15, 2008.

The 12th International Congress on Yeasts was held in Kyiv, Ukraine, between 11 and 15 August 2008. This general congress of scientists studying yeasts, reflected many of the new directions in yeast research. Of particular note was the focus on the influence of systems biology in understanding the function of the intracellular components of yeast. The plenary lecture of John Aitchinson of the Institute for Systems Biology in Seattle, USA, illustrated how the interaction of molecular biology together with the various “omics” technologies and computation biology could lead to a new holistic understanding of yeasts, opposed to a previous emphasis on single gene functions, which did not necessarily produce conclusive results. The refinement of these new approaches will necessarily lead to a better understanding of genes and will most likely be reflected in presentations at future congresses.

Of prime importance at the congress was the emphasis on bio-fuel production. Specifically, much attention was given to progress in the development of a robust *Saccharomyces cerevisiae* strain capable of fermenting pentose sugars in order to produce significant ethanol concentrations. This topic has been reported on regularly at yeast congresses for the past 25 years or so. The new molecular technologies have assisted in engineering *S. cerevisiae* yeast that can ferment xylose to ethanol. However, the fermentation rate is relatively slow with a rather low ethanol concentration. Currently, other yeasts able to naturally ferment pentoses now appear to be receiving more attention after a long period when they were virtually ignored. A combination of investigation of the pentose fermenting ability of yeast genera together with further molecular manipulation of *S. cerevisiae* will lead to steady progress in achieving a yeast strain able to co-ferment pentoses and hexoses on an industrial scale. Researchers agree however that it might still be a while before optimal bio-fuel production is attained through yeast fermentation, therefore it can be expected that this issue will continue to be discussed at yeast congresses.

An interesting session on yeast ecology was chaired by Johan Schnürer and Leda Mendonça-Hagler, respectively from the Swedish University of Agricultural Sciences in Uppsala and the Universidade Federal do Rio de Janeiro in Brazil. Most notable contributions to this session were the lectures and posters on reducing postharvest diseases of crops using yeasts as biocontrol agents. Also noteworthy were the presentations on yeast diversity associated with various natural habitats. The most interesting of these were the biodiversity studies conducted at the Universidade Federal do Rio de Janeiro, involving the identification of specific yeast communities occurring in different habitats, as well as the research conducted by students at the Moscow State University involving the diversity of yeast species associated with Sphagnum mosses and the occurrence of yeast within the storage tissue of plants.

The session chaired by Teun Boekhout and Alistair Brown, from the CBS Fungal Diversity Centre in The Netherlands and the University of Aberdeen in the United Kingdom respectively, mirrored the current state of research on the biology of medically important yeasts. The work presented at this session revealed that although different aspects of yeast biology is being studied in different laboratories the world over, the major opportunistic yeast

pathogens of man, still remain representatives of the genera *Candida*, *Cryptococcus* and *Malassezia*. Studies involving gene regulation and signalling proved to be immensely interesting. Research presented by Bernard Hube, from the Leibniz Institute, was able to identify the genes and factors that influence the switch of *C. albicans* from a commensal state to a pathogenic one. Microarrays were further able to determine that *C. albicans* displays stages of infection that are linked to certain genes which could result in more targeted treatment of this pathogen. Similarly, Alistair Brown, from the Aberdeen Fungal Group, demonstrated that *C. albicans* maintains a functional heat shock response despite its lack of exposure to sudden temperature changes. Such conserved responses may indicate the presence of a yet unidentified ecological niche for this pathogenic species.

The session chaired by Grzegorz Bartosz and Bernard Prior, respectively from the University of Rzeszow in Poland and the University of Stellenbosch, South Africa, gave an indication of the stress responses seen within various yeast species. The research presented by Bernard highlighted the differences in osmotic stress response seen between ascomycetous and basidiomycetous yeasts. While he demonstrated that on a whole, basidiomycetous yeasts are more sensitive to osmotic stress, the molecular mechanism of osmotic stress response in this group have been rarely studied and would prove of great interest especially where pathogenic species are concerned. A further aspect of this session focused on the engineering of an industrial strain able to tolerate the stresses involved in the production of the desired product such as extreme temperatures, lactic acid and biofuels.

To conclude, we would like to thank Andriy Sibirny, and the rest of his organizing committee, for a well planned congress held in a beautiful city. We will always remember this congress for the collegial spirit among its attendees, as well as for the invaluable experience younger scientists obtained by discussing science with some of the great names in yeast biology.

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