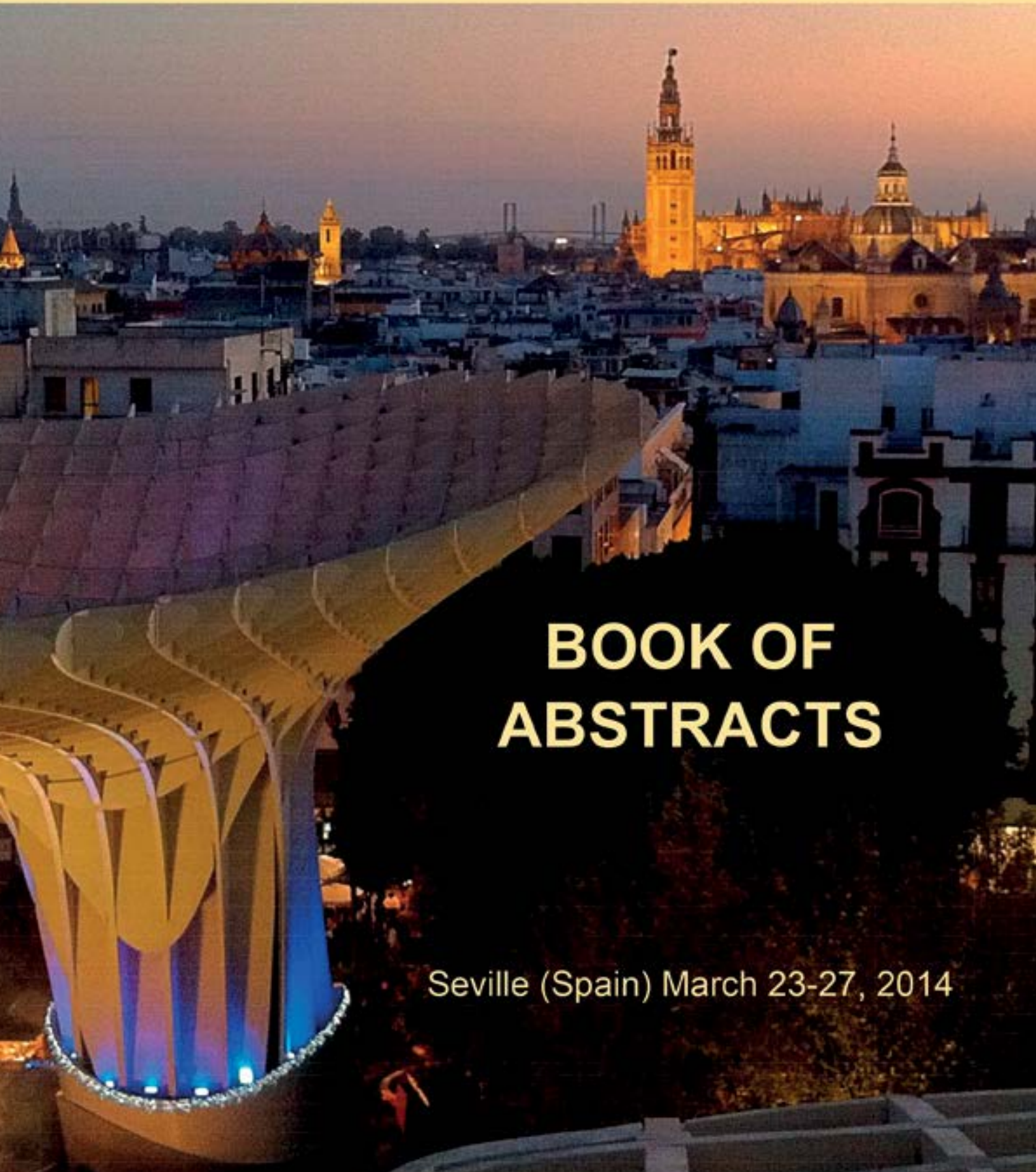
ECFG12
Seville 2014

12th European Conference on Fungal Genetics



BOOK OF ABSTRACTS

Seville (Spain) March 23-27, 2014

127 MUTATIONAL ANALYSIS OF THE PH-SENSING RECEPTOR PALH

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There is a well-conserved signalling pathway among ascomycete fungi to mediate environmental pH sensing. This pathway, involving six proteins (PalA, PalB, PalC, PalF, PalH and PalI) in Aspergillus nidulans, mediates the activation of the transcription factor PacC under alkaline conditions. PalH is a seven-transmembrane domain protein reminiscent of G Protein Coupled Receptors (GPCR) but, instead of signalling through a heterotrimeric G protein, it is coupled to the positive-acting, arrestin-like protein PalF through the two PalF Binding Domains located in its cytosolic tail. PalH is phosphorylated exclusively under alkaline pH. However, this phosphorylation is not essential for pH signalling, and hence its physiological role remains unclear.
In addition, site-directed mutagenesis analyses of PalH interhelical loops and transmembrane helices have been carried out. This screening has led to the identification of several loss-of-function mutations and, importantly, of weak gain-of-function mutations, a class of mutations in the pH signalling receptor that had not been previously described. In this mutant background, a certain degree of PacC proteolytic processing activation is detectable under acidic conditions. With previously reported data indicating that PalH acts upstream of all other Pal proteins with the exception of PalI (a traffic 'policeman'), these results strongly indicate that PalH is the pH sensing receptor in the Pal/pH signalling pathway.

128 MYCELIAL GROWTH UNDER HYPOXIA AND ANOXIA PRODUCE CONIDIA WITH ALTERED STRESS TOLERANCE IN ENTOMOPATHOGENIC FUNGI

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Hypoxia (low oxygen concentrations) and anoxia (lack of oxygen) in filamentous fungi causes significant changes in their metabolism, germination, mycelial growth, and conidial production. The conidial thermotolerance and conidial tolerance to menadione-induced oxidative stress were studied when conidia were produced under hypoxia (Petri dishes sealed tree times with Parafilm), anoxia (the cultures were grown for 24 h under normoxia and transferred to anaerobiosis jars for five days, then transferred back to normoxia for eight days), and compared with conidia produced under normoxia (normal oxygen concentrations), and minimal medium. Ten insect-pathogenic fungal species were used in this study, including Aschersonia aleyrodis, Beauveria bassiana, Isaria fumosorosea, Lecanicillium aphanocladii, Metarhizium. anisopliae s.l. M. brunneum, M. robertsii, Tolypocladium cylindrosporum, T. inflatum, and Simplicillium lanosoniveum. Conidia of three fungal species T. cylindrosporum, M. anisopliae, and L. aphanocladii produced under hypoxia have increased thermotolerance. Only A. aleyrodis conidia produced after the anaerobiosis condition were more resistant to heat. The nutritive stress induced higher conidial thermotolerance on M. brunneum, M. robertsii, T. inflatum, and M. anisopliae. Mycelial growth under hypoxia conditions also had induced increased tolerance to menadione in four fungal species, B. bassiana, M. brunneum, M. robertsii, and M. anisopliae. Again, only conidia of the fungus A. aleyrodis produced after the anaerobiosis condition were more resistant to oxidative stress. MM induced high menadione tolerance on six fungal species B. bassiana, M. brunneum, M. robertsii, T. cylindrosporum, M. anisopliae, and S, lanosoniveum. In conclusion, conidia produced under hypoxia increased tolerance of three fungal species to heat and four species to menadione in relation to conidia produced in normoxic conditions. The anoxic stress only induced higher tolerance to heat and menadione in Aschersonia. The nutritive stress, however, induced higher thermotolerance in four species and higher menadione tolerance in six species. The hypoxic condition did not decrease conidial production in the majority of species; the only reduction was for S. lanosoniveum and A. aleyrodis. The anoxic condition caused mycelial death of four isolates, but on the other isolates, this condition generally did not harm conidial production. The conidial production on MM was negligible.

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