CEITEC

Research Group Functional Genomics and Proteomics of Plants

is very pleased to invite you to attend a seminar
presented by

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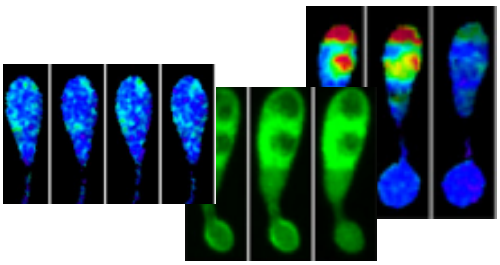
Deconstructing the cell wall polysaccharide matrix of the rice blast fungus *Magnaporthe oryzae*

May 9, 2016
Monday, 15.00-16.00
Seminar room 1.17, building A3
University Campus Bohunice



The fungal cell wall is vital for the protection of fungal cells and for determining cell shape and function. This is of particular importance for pathogenic fungi, many of which elaborate specialised infection structures to invade their hosts. In spite of its importance, we know little about the structure, content and turnover of the cell wall in plant pathogenic fungi. Here, we provide the first in-depth description of the carbohydrate composition and structure of the cell wall of the rice blast fungus *Magnaporthe oryzae*. We focus on the family of glucan elongation proteins (Gels) and characterise five putative β-1,3-glucan glucanosyltransferases, that each carry the Glycoside Hydrolase 72 signature. We reveal that *M. oryzae GH72*$^{+}$ *GEL*s, (*GEL3* and *GEL4*), which carry a putative carbohydrate-binding module, are expressed in spores and during both infective and vegetative growth. We generated targeted deletion mutants of all of the *Magnaporthe oryzae* Gel isoforms, revealing that each individual Gel enzymes is dispensable for pathogenicity. To investigate the contribution of Gel enzymes to cell wall structure, we generated double and triple mutants to cover all GH72^{+} and GH72^{-} isoforms, and demonstrated that a *Δgel1Δgel3Δgel4* null mutant has a modified cell wall in which 1,3-glucans have a higher degree of polymerization compared to the wild-type strain. Indeed, those glucans are less branched, as indicated by the lower proportions of 1,3,6-Glcp observed in the mutants. The Gel-deficient mutant exhibited a hyper-branching phenotype and no sporulation, and therefore was unable to cause rice blast disease. We conclude that Gel proteins play significant roles in structural modification of the fungal cell wall during appressorium-mediated plant infection.