Susanne Zeilinger et al., J Biotechnol Biomater 2014, 3:5
http://dx.doi.org/10.4172/2155-952X.S1.027

OMICS Group Conferences
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5th World Congress on
Biotechnology

June 25-27, 2014 Valencia Conference Centre, Valencia, Spain

How MAP kinase signaling regulates the transcriptomic and proteomic response of the biocontrol fungus *Trichoderma atroviride*

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The fungal genus *Trichoderma* comprises powerful industrial enzyme producers and successful biofungicides applied in today's agriculture. The biological control of plant diseases by *Trichoderma* includes direct antagonism of phytopathogenic fungi by parasitism; however, our understanding of the exact molecular mechanisms of their activity still is fragmentary. The direct attack of prey fungi (mycoparasitism) by Trichodermaatroviride comprises sensing of the prey and chemotropic growth towards it followed by activation of the production of "molecular weapons" such as cell wall-lytic enzymes, secondary metabolites, and infection structures. *T. atroviride* mutants missing the mitogen-activated protein kinase (MAPK) Tmk1 show infection structures comparable to the parental strain, however, they over-produce chitinases, key enzymes of mycoparasitism, and show elevated antifungal activity caused by over-production of low molecular-weight metabolites. Despite these enhancements in mycoparasitism-relevant processes, Δ*tmk1*mutants exhibit reduced mycoparasitic activity against prey fungi.These findings suggests thatadditional still unknown genes/proteins and processes are contributing to *T. atroviride* mycoparasitism which were aimed to be identified by using the Δ*tmk1* mutant as a tool. To this end, comparative transcriptomic and proteomic approaches were applied to identify target genes and proteins being regulated by the signaling pathway employing the Tmk1 MAPK upon prey recognition and playing key roles in triggering of the mycoparasitic response.

Biography

Susanne Zeilinger is Senior Scientist and Group Leader at the Vienna University of Technology at the Department of Biotechnology and Microbiology. She has completed her PhD in the field of gene regulation in an industrial fungal cellulase producer and, after a research stay at the University of Naples, started to work on fungal biocontrol agents. She has received several grants and awards and has contributed to the annotation of the genomes of two Trichoderma species, co-authored more than 50 journal papers and book chapters, and is editorial board member of the journals Biocontrol Science and Technology and BMC Fungal Biology and Biotechnology. Her current research focuses on fungal molecular biochemistry including signal transduction and secondary metabolism in mycoparasitic fungi.

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