

LS13-086 - From organismic to biomolecular interactions: Visualizing signaling complexes in the fungal membrane during phytopathogenic attack

Abstract

Mycoparasitic *Trichoderma* fungi are among the most successful biofungicides in today's agriculture although our understanding of the exact molecular mechanisms of their activity still is fragmentary. The attack of phytopathogens by the mycoparasite is preceded by chemotropic growth towards the prey and pre-contact induction of its "molecular weapons", consequently the receptors and signaling pathways involved in sensing and responding to the prey are of special interest. Cell surface receptors for host recognition, their ligands, interactors and localization in the membrane as well as membrane architecture itself are largely unexplored in pathogenic filamentous fungi. The objective of the proposed project is to gain detailed insights into the signaling dynamics and hence function of the virulence-associated Gpr1 receptor during chemotropism and interaction of *Trichoderma* with a prey. By combining fungal genetics, optical microscopy and biophysics, receptor localization and movement such as polarization towards the prey and association with its interactors shall be monitored at the single molecule level in the native cell membrane by recent super-resolution microscopy of living fungal hyphae. Imaging of Gpr1 signaling complexes at the single-molecule level in the mycoparasite during sensing and directed growth to the prey will reveal unprecedented insights into fundamental biological processes underlying fungal pathogenicity and will open up new avenues in super-resolution microscopy of fungal organisms.

Scientific disciplines:

Molecular biology (40%) | Biophysics (40%) | Microbiology (20%)

Keywords:

organismic interaction, *Trichoderma* fungi, membrane proteins, receptor signaling, single molecule tracking, super resolution microscopy, membrane architecture

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Further links to the persons involved and to the project can be found under <https://wwtf.at/funding/programmes/ls/LS13-086/>