

Public Abstract

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Graduation Term:SS 2012

Department:Animal Sciences

Degree:MS

Title:Influences of Combinatorially Selected Peptides on Inhibition of *Gibberella zeae* Spore Germination and Cytological Modifications of Emerging Germ-Tubes

The ascomycete *Gibberella zeae* causes head blight of wheat and other grains. Head blight reduces wheat-kernel weight and limits yield. *Gibberella zeae* infection also results in mycotoxin accumulation within harvested grain, which significantly limits the marketability of the crop.

To enhance wheat resistance to head blight, peptides were identified from combinatorial phage-display libraries that inhibit ascospore germination and germ-tube growth. Two peptides, f3-16 and f8-18, were identified pathogen-affinity selected collections that inhibit germ-tube growth and induce aberrant germ-tube morphology.

Experiments were conducted to evaluate whether inhibitory peptide f3-16 affects constituents of the germ-tube apical cell that are important for polarized elongation, including endocytic system components, sterol-rich plasma membrane domains (SRD), and patterns of cell wall deposition.

When ascospores were incubated with the inhibitory peptide f3-16, endosomes densely accumulated within the germ-tube cytoplasm, and vacuole formation appeared to be inhibited. The distributions of SRDs and chitin deposition were also altered in ascospore germ-tubes incubated with peptide f3-16. These cellular components were observed in only patchy distribution throughout remaining subapical regions of the germ-tube.

This study provides the first description of cytological changes in germinating ascospores induced by a combinatorially selected inhibitory peptide. The characterized cytological phenotypes provide the ground work for mechanistic studies of growth inhibition and morphological modifications caused by inhibitory peptides