

**ULTRASTRUCTURAL RESPONSE OF COTTON
FUNGAL PATHOGENS TO MAGAININ 2**

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Abstract

Thielaviopsis basicola, *Rhizoctonia solani*, *Fusarium oxysporum*, *Verticillium dahliae* and *Pythium ultimum*, the major fungal pathogens of cotton cause serious yield loss of cotton worldwide. We are examining bioactive peptides with potential for transgenic expression to control fungal pathogens. Magainin 2, a 23- amino-acid peptide, isolated from the African clawed frog has broad-spectrum antimicrobial activity. 0.05 µg/µl magainin 2 in potato dextrose broth completely inhibited the hyphal growth of these pathogens except *P. ultimum*. Transmission electron microscope observations were taken on ultrathin sections of control and treated (1 ug of magainin 2) fungal colonies grown on potato dextrose agar, at 12 and 24 hours. After 12 h ultrastructural responses of *T. basicola*, *R. solani*, *F. oxysporum*, *Verticillium dahliae* to magainin 2 were similar. The size, shape and structure of mitochondria changed, the mitochondrial and cytoplasmic matrices degraded, and the number of ribosomes decreased. The structural degeneration of the hyphal cells was more severe 24 h after treatment. These morphological changes could be explained by the disturbance in selective permeability of the mitochondrial membrane which, in turn, affects the whole cellular metabolism through insufficient energy supply. Failure of magainin 2 to affect the growth of *P. ultimum* may be related to its large and numerous lipid bodies. The low molecular weight and bioactivity of magainin 2 makes it a strong candidate for engineering into cotton to enhance fungal resistance.