

The evolution of GH18 chitinases in fungi from order Hypocreales involves gene gain by Horizontal Gene Transfer.

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INTRODUCTION: The chitin degradation to chitodextrin could be catalyzed by enzymes from the GH18 chitinase-like superfamily. These enzymes are present in a wide range of organisms, from bacteria to plants, that use fungi and insects as food resources or hosts.

OBJECTIVES: This work identified the chitinase protein families among the predicted protein-coding genes in 12 species from the genera *Trichoderma*, *Cordyceps*, *Metarhizium*, *Beauveria*, *Nectria* and *Fusarium* in an attempt to better understand their role in the entomopathogenic and mycoparasitic lifestyles in the fungi from order Hypocreales.

MATERIAL AND METHODS: The predicted protein-coding genes from the species analysed (including entomopathogenic, mycoparasitic and plant-pathogenic species) were clustered in gene families with the MCL algorithm. The patterns of gain and loss in the gene families were studied using the Perl script BadiRate. The gene families were identified using the InterProScan. Sequences similar to those from GH18 chitinase D-like were found in the GenBank nr database using BLASTp.

DISCUSSION AND RESULTS: 7 genes from the GH18 chitinase D-like family were found in the entomopathogenic and mycoparasitic species. This family is related to chitin degradation to chitodextrin in many bacteria. The BLASTp search in the nr database found some similar sequences in a few other sordariomycetes, but not in other groups of eucaryotes. The phylogeny of GH 18 chitinase D-like family is consistent with the hypothesis that the sordariomycetes has obtained these genes by horizontal gene transfer from a bacterial donor. Other gene families from the GH18 chitinase-like superfamily present in the 12 analysed fungi are common in other fungi (and eucariotes) and do not show evidences from evolution by HGT.

CONCLUSION: The results suggest that the evolution of chitin degradation in *Trichoderma*, *Cordyceps*, *Metarhizium* and *Beauveria* may have involved the acquisition of a GH18 chitinase D-like protein family from bacteria by HGT.

Key words: GH 18 chitinase D-like, entomopathogenic fungi, mycoparasitic fungi, horizontal gene transfer.

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