Comparative genomics of MAP kinase and calcium-calcineurin signalling components in plant and human pathogenic fungi.

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Abstract

Mitogen-activated protein kinase (MAPK) cascades and the calcium-calcineurin pathway control fundamental aspects of fungal growth, development and reproduction. Core elements of these signalling pathways are required for virulence in a wide array of fungal pathogens of plants and mammals. In this review, we have used the available genome databases to explore the structural conservation of three MAPK cascades and the calcium-calcineurin pathway in ten different fungal species, including model organisms, plant pathogens and human pathogens. While most known pathway components from the model yeast Saccharomyces cerevisiae appear to be widely conserved among taxonomically and biologically diverse fungi, some of them were found to be restricted to the Saccharomycotina. The presence of multiple paralogues in certain species such as the zygomycete Rhizopus oryzae and the incorporation of new functional domains that are

lacking in S. cerevisiae signalling proteins, most likely reflect functional diversification or adaptation as filamentous fungi have evolved to occupy distinct ecological niches.

Involved units

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