Crystal Structure of a Native Chitinase from the Fungal Pathogen Aspergillus Fumigatus YJ-407 (afCHI)

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Chitinase hydrolyzes chitin, which is a structural component of cell walls and coating of many organisms. In fungi, chitinase is thought to contribute to a number of morphognetic processes in filamentous fungi. Therefore, fungal chitinase is thought to be a putative virulence factor and a promising anti-fungi target molecule. As one of the most ubiquitous of the airborne saprophytic fungi, Aspergillus fumigatus has been shown to be an opportunistic pathogen causing pneumonia and other fatal invasive inflection. Except for endo- and exo-hydrolytic activities, a transglycosyl activity was observed in the extracellular chitinase (afCHI) from Aspergillus fumigatus YJ-407.

This native chitinase from the fungal pathogen Aspergillus fumigatus YJ-407 (afCHI) has been crystallized and the X-ray structure has been solved to 2.1Å resolution by molecular replacement. Like other members of the class 18 hydrolase family, this fungal enzyme is of an eight_stranded b/a-barrel. And a GlcNAc was observed in the glycosylation site (Asn257-Asp258-Thr259). Structural comparisons revealed that structural features such as substrate binding site, residues in active site and catalytic acid are conserved. Furthermore, the physiological role of saccharide and the structural basis of transglycosyl activity were discussed.

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