

# Papers of the Week

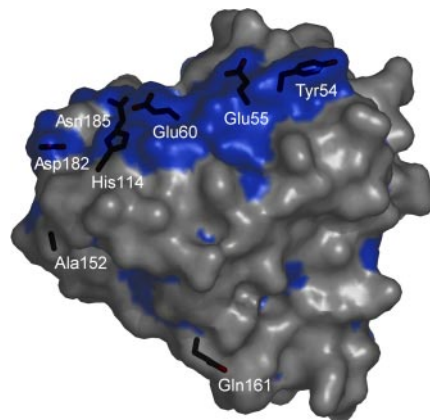
## Chitinase's Little Helper ♦

More than one billion tons of chitin are produced by insects, fungi, and marine organisms every year. Despite this abundant production, chitin does not accumulate in most ecosystems, indicating that the carbohydrate polymer is somehow degraded. Many aquatic and terrestrial microorganisms contain chitinases, which are responsible for breaking down chitin. For example, the Gram-negative soil bacterium *Serratia marcescens* produces three chitinases, ChiA, ChiB, and ChiC. In addition to these chitinases, *S. marcescens* also secretes a small non-catalytic protein, CBP21, when it is grown on chitin.

In this Paper of the Week Gustav Vaaje-Kolstad and colleagues report that CBP21 is involved in promoting chitinase activity. CBP21 binds to chitin leading to disruption of the substrate's crystalline structure and allowing increased accessibility. When added to ChiA and ChiC, CBP21 strongly promotes hydrolysis of chitin, and it is essential for full chitin degradation by ChiB. CPB21 exerts its effects via specific polar interactions, which are involved in both binding and alteration of chitin structure. Because homologues of the *cbp21* gene can be found in the genomes of most microorganisms that possess chitinase genes, the authors suggest there is a common mechanism by which these chitin-binding proteins promote degradation.

This paper provides the first compelling evidence that non-catalytic proteins can potentiate enzymatic hydrolysis of recalcitrant polysaccharides by disrupting the crystalline structure of the substrate. Such a phenomenon has been postulated for 50 years, and until now, there has been no significant evidence to support the proposal.

♦ See referenced article, *J. Biol. Chem.* 2005, **280**, 28492–28497



CBP21 contains a patch of hydrophilic residues (*blue*) that are important for chitin binding and promoting chitinase activity.