BACKGROUND

Glucuronoyl esterases (GEs) are a relatively new type of enzyme which cleave an ester linkage connecting lignin to glucuronoxylan (Figure 1A). Putative GEs have been identified in many biomass degrading microbes and are now classified in the Carbohydrate Esterase 15 (CE15) family. Phylogenetic analysis of CE15 members indicates that the family has a wide degree of sequence diversity (Figure 1B). Previously, few GEs have been biochemically characterized and only three protein structures had been determined.

OBJECTIVE

Advance understanding of the CE15 family by biochemically characterizing and determining structures of bacterial CE15 proteins from across the protein family.

METHODS

- Cloning, recombinant expression, and protein purification of specific targets from across the tree
- Biochemical characterization on model substrates
- Crystallization & structure determination by X-ray diffraction

BACTERIAL CE15 STRUCTURES

We have determined 3 bacterial CE15 protein structures (OtCE15A, SuCE15C, and 7tCE15A)\(^1\).\(^2\). Significantly, the bacterial CE15 members have inserted regions relative to their fungal counterparts which may modulate substrate specificity.

OtCE15A COMPLEXED WITH XUX

We have been pursuing ligand complexes with our solved structures. A OtCE15A structure in complex with the glucuronoxylan tetrasaccharide XUX has been determined and reveals key residues involved in xylan binding.

REFERENCES


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