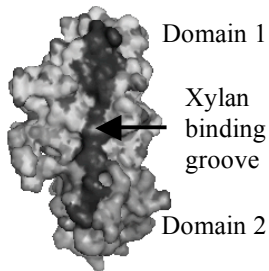


## W0630

**Crystal Structure and Biochemical Activity of Zea m 1 (EXPB1) : Implications for the Mechanism of Cell Wall Loosening by Beta Expansins.** Neela Yennawar<sup>1</sup>, Lian-Chao Li<sup>2</sup>, Hemant Yennawar<sup>3</sup>, Akira Tabuchi<sup>2</sup>, Daniel J. Cosgrove<sup>2</sup>, <sup>1</sup> Huck Institute of the Life Sciences, <sup>2</sup>Dept. of Biology, <sup>3</sup>Dept. of Biochemistry and Molecular Biology, Penn State Univ., University Park, PA 16802.

Zea m 1 is a member of the beta-expansin subfamily known as group-1 grass pollen allergens. It has wall-loosening activity with grass cell walls. We have determined its crystal structure by X-ray crystallography to 2.75Å resolution. It has two domains. Domain 1 has substantial structural similarity to the catalytic domain of an endoglucanase (Humicola EGV) from family GH45. However, tests for hydrolytic activity against various wall polysaccharides proved negative.



Domain 2 of Zea m 1 is an immunoglobulin-like beta sandwich, structurally similar to Phl p 2, a group-2 grass pollen allergen. Domains 1 and 2 have aromatic and polar residues that form a 55 Å long shallow binding groove for potential polysaccharide binding running the length of the protein. The residues along the groove are conserved in beta-expansins. Our biochemical studies have shown that Zea m1 binds to maize cell walls, where the binding is to an arabinoxylan and cellulose. We have modeled a glucuronoarabinoxylan in the putative sugar binding groove and hypothesized a mechanism for the cell wall-loosening action of beta-expansins.