Using antibodies to understand the complexities of plant cell walls

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Conference summary:

The rigid structures at the surface of plant cells are some of the most structurally complex & mechanically robust sets of biomaterials in nature. Given the dominance of plants on land, these cell walls are highly abundant and are a major repository of fixed carbon and form the bulk of the Earth's biomass. Plant cell walls and their component polymers are used extensively for food, textiles, paper, lumber and industrial polymers as well as a sustainable form of bioenergy.

Our research interests are focused on plant cell walls in relation to plant cell development & growth as well as their use in applied & industrial contexts. We are specifically interested in developing tools to understand primary cell wall structures & architectures in relation to cell adhesion, cell expansion & the differentiation of plant cells. We are also interested in secondary cell wall structures and properties in growing plants as well as in relation to their use as industrial fibres.

Our lab maintain, and continue to develop, a panel of rat hybridoma & phage display monoclonal antibodies to plant cell wall glycans to help in our studies of cell walls and for the imaging of cell wall molecular architectures. We also use carbohydrate-binding modules (CBMs) from microbial glycoside hydrolases as molecular probes for cell wall polymers.

Immunochemistry is a major tool in our strategies and procedures to explore cell wall properties and functions. Our antibodies and CBMs are also being assembled for use in high throughput, systematic procedures for cell wall analyses including epitope detection chromatography (EDC) which uses our panels of molecular probes and detection tools for chromatographic separations of cell wall matrix glycans.