Exploring the interactions of cellulose with other matrix polysaccharides is key to linking cell wall structure to cell growth and mechanics. However, due to the lack of high-resolution techniques for characterizing the molecular structure, dynamics and intermolecular interactions of polysaccharides in the cell wall, little is known about how cell wall polymers form 3D networks to provide mechanical strength to the cell wall while allowing cell wall expansion and growth.

In the last few decades, structural characterization of cell walls has mainly involved chemical extraction followed by glycoanalysis and microscopic imaging, an approach limited by significant perturbations in wall structure and insufficient spatial resolution. In addition, in vitro binding assays have been used to measure the binding affinity between different wall polysaccharides, but this method does not reproduce the complex molecular interactions in natural walls after biosynthesis. Current advances in biophysical techniques have led to the development of a variety of new methods including scattering, spectroscopy and microscopy techniques such as AFM and FESEM that can be used to examine the interaction of cellulose and matrix polysaccharides.