Plant cell morphogenesis is largely dependent on the coordination of cytoskeletal elements, plasma membrane, and vesicle trafficking. Formin proteins are nucleators of the actin cytoskeleton. Plant Class I family formins are integral membrane proteins and thus have the ability to coordinate cytoskeletal dynamics with the plasma membrane localization. We identified *Arabidopsis thaliana* formin AtFH4 as a microtubule associated protein. The binding is conferred by a novel domain located between the transmembrane domain and the formin homology 1 domain. The protein associated with actin in *in vitro* conditions. Overexpressed AtFH4 accumulated in the endoplasmic reticulum, and induced coalignment of endoplasmic reticulum membranes with microtubules. Together, these data suggest that the combination of plant-specific and conserved domains enables AtFH4 to function as an interface between membranes and both major cytoskeletal networks .

Secretory pathways supported by the activity of the Golgi apparatus play a crucial role in cytokinesis in plant cells. Prior to their fusion with the plasma membrane, secretory vesicles are tethered at exocytic sites by the exocyst, an octameric protein complex. We analysed the mutant in the EXO84b exocyst subunit, and discovered that the mutant plants were dwarfed and exhibited cytokinetic defects. The dwarf stature of the mutants is probably caused by a general secretion defect. The cytokinetic deviations resulted from a post-cytokinetic cell wall maturation defect; this we inferred from the behaviour of GFP-tagged SEC6, SEC8, SEC15b, EXO70A1, and EXO84b exocyst subunits during cytokinesis. These exhibited distinctive localization maxima at the cell plate initiation and cell plate maturation stages, suggesting that the exocyst is also involved in the assembly of the cell plate. Accordingly, the cell plate assembly of *exo70A1* mutants was defective. We conclude that the exocyst complex is involved in secretory processes during cytokinesis in *Arabidopsis* cells; in cell plate initiation, cell plate maturation, and formation of new primary cell wall.

The available data present localizations of the bulk of exocyst proteins to plasma membrane domains associated with high secretion activity. We used variable-angle epifluorescent microscopy that provides higher signal-to-background ratio than confocal microscopy to visualize exocyst subunits at the plasma membrane. Exocyst subunits localized into distinct foci at the plasma membrane, likely corresponding to the individual exocytic sites, which were distinct from sites of endocytosis marked by the dynamin-related protein 1C. Exocyst foci partially overlapped with *bona fide* vesicles markers – the membrane fluorescent dye FM4-64 and v-SNARE VAMP721. We further analysed colocalization of the exocyst foci with actin and microtubule cytoskeletons. These results provide first insights into the dynamics of single exocytic events at the plant plasma membrane in plant cells, and at the same time provide further experimental evidence for the exocyst function in the vesicle tethering process in plants.