

Abstract

Plant cells exhibit two types of growth: diffuse and apical. Mutation of the ARP2/3 complex, which is an actin nucleator, leads to phenotypic expression in both diffusely and apically growing cells. Many of these changes, such as impaired epidermal cell adhesion of hypocotyl cells or slower growth of pollen tubes, suggest that the observed phenotypes are cell wall related. Cell wall components are transported into the apoplastic space by exocytosis. Many factors are involved in controlled exocytosis, one of the most studied being the exocyst tethering complex. Mutants of the exocyst complex show phenotypes in both diffusely and apically growing cells, indicating that this complex is important for both types of growth. In addition, subunit EXO84b of the exocyst complex interacts with subunits of the ARP2/3 complex. In this thesis, I investigated the effect of mutation of ARP2/3 complex subunits on exocytosis of diffusely and apically growing cells by observing the localization and dynamics of the fluorescently labeled marker EXO84b-GFP. In epidermal hypocotyl cells (a model of diffuse growth), EXO84b-GFP had a shorter lifetime at the plasma membrane in ARP2/3 mutants compared to wild type. The pattern of its localization to the plasma membrane was also slightly different. It was not possible to examine EXO84b-GFP dynamics in pollen tubes (apical growth model) for technical reasons. Therefore, I focused on the zonation of this marker, which did not significantly differ in ARP2/3 mutants compared with wild type.

Keywords: ARP2/3 complex, plant cell expansion, actin cytoskeleton, exocytosis, exocyst, pollen tube, hypocotyl