Abstract
Thanks to its sessile life strategy, the polarity of plant body reflects the polarity of single cells. The polarity is maintained by asymmetric distribution of various molecules downstream from extra and intracellular signals. Directional transport of auxin plays an important role in the pattern formation, morphogenesis, and directional growth responses. The positioning of PIN auxin efflux transporters has been shown to be crucial in the setting of auxin gradients. It is dependent on the plasma membrane deposition of membrane vesicles and their constitutive cycling between plasma membrane and endosomal space. Although some evidences support the idea of differential actin and microtubular cytoskeleton dependence of PIN protein trafficking, there is a significant lack of the information on the role of cytoskeleton in this process. In this paper we use combination of live cell imaging and immunofluorescence techniques to search for the molecular players of actin filaments (AFs) and proteins proteins associated with AFs in the mechanisms of endocytosis and directed PIN1 protein targeting. Seedlings of *Arabidopsis thaliana* carrying mutations in actin genes (*ACT1*, *ACT2*, *ACT7*, *ACT11*), Arp 2/3 complex genes (*ARP2*, *ARP3*, *ARPC2*, *ARPC5*), WAVE complex components genes (*BRK1*, *NAP1*, *SRA1*) and actin monomer binding proteins genes (*ADF1*, *ADF4*, *ADF5*, *PRF1*, *PRF2*) were tested for the the rate of the endocytosis using FM-4-64 uptake by root epidermal and cortex cells. Simultaneously, PIN1 protein was immunolocalized in whole mounts by indirect immunofluorescence. We show here that with only few exceptions all mutations presented here either reduced the rate of FM 4-64 endocytosis and its progression or changed the appearance of endocytic vesicles. The localization of PIN1 in the root tip stele cells did not show any significant changes in all mutants screened here with one exception. Plant carrying the mutation in the *ARPC5* gene coding for the subunit of Arp2/3 complex had prominent PIN1 plasma membrane staining and some granulated signal through the cytoplasm. Our results suggest that actin and actinassociated proteins analyzed here seem to be not primarily important for PIN1 localization within the basal plasma membrane of root provasculature. However, they are essential for proper membrane trafficking and endocytic vesicle formation and dynamics which makes in turn part of the PIN1 protein targeting and cycling. The analysis of other mutations is in progress