ARPC2 protein localization in a plant cell

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1 Abstract

Actin cytoskeleton is an ubiquitous structure which plays numerous irreplacable roles. Actin nucleation is, beside formins, performed by ARP2/3 complex (actin-related protein), comprising of seven subunits (ARP2, 3, C1-C5) and activated by protein SCAR/WAVE complex. ARP2/3 complex is attached to the membrane and branches existing microfilaments, apart from nucleating them *de novo.* ARP2/3 mutants in most organisms show severe defects. However, plant mutants exhibit only mild phenotype, for example, *Arabidopsis thaliana* ARPC2 mutant (*dis2-1)* has deformed trichomes and leaf epidermal cells, but its viability is not impaired. The aim of the thesis is to map ARPC2 localization within the cell and broaden our understanding of ARP2/3 complex role in plant cell morphogenesis. Tobacco ARPC2 (NtArpC2) subunit was visualized in *Arabidopsis* plants, using the GFP fusion protein as well as imunofluorescence and anti-ARPC2 antibody. Experiments were undertaken to collocalize the subunit with actin and microtubular cytoskeleton, with mitochondrions, endosomes and other membrane organelles. The specimens were observed in confocal and TIRF microscope. The GFP-NtARPC2 protein shows as motile dots; their movement, but not their existence, is dependent upon actin cytoskeleton. The movement of the dots is similar to the *stop-and-go* movement of Golgi apparatus. Collocalization of the dots with the concrete cell structures was not convincing. According to the biochemical experiments, the GFP-NtARPC2 protein seems to be partly cleaved in cytoplasm of transformed cells. Both GFP-NtARPC2 and NtARPC2 proteins are able to complement the mutant phenotype of *dis2-1* plants.

2 Keywords:

ARP2/3 complex, actin, cytoskeleton, NPF, SCAR/WAVE, ARPC2