

## ABSTRACT

On the basis of detailed phenotypic examination of *fh1* and *fh2* mutants we observed that the main housekeeping *Arabidopsis thaliana* formin AtFH1 (At3g25500) and its closest relative, *AtFH2* (At2g43800) are involved in both actin filaments and microtubule dynamics. *fh1* mutants showed increased sensitivity to the actin polymerization inhibitor Latrunculin B (LatB). Formin mutants had cotyledon pavement cells which exhibited more pronounced lobes compared to the wild type, and alterations in vascular tissue patterning were found. The double *fh1 fh2* homozygote was not obtained, suggesting that at least one functional formin gene is required for proper gametophyte development. Methods used to observe and quantify both architecture and dynamics of the cortical cytoskeleton from confocal laser scanning microscopy (CLSM) and variable angle epifluorescence microscopy (VAEM) were standardized and allowed to find that mutants exhibited more abundant but less dynamic F-actin bundles and more dynamic microtubules than wild type seedlings, *fh1* mutant phenotype observed in roots was further aggravated by a (heterozygous) *fh2* mutation. The formin inhibitor SMIFH2 mimicked the alterations observed in *fh1* mutants in plants, it has been the first report of this inhibitor in plants. Defects in membrane trafficking were observed in formin mutants and confirmed by SMIFH2 inhibitor which slowed down the movement of CLC-GFP dots.