Abstract

During their long evolutionary history, plants evolved complex metabolic and structural innovations and mechanisms to regulate their development. *LATE MERISTEM IDENTITY 1 (LMI1)* and its homologs are known growth regulators that control angiosperm leaf morphology, but little is known about their function in diverse plant groups and their significance for the evolution of plant development. These genes belong to the homeobox leucine-zipper (HDZ) transcription factor (TF)-encoding gene family which originated in streptophyte algae, ancestors of land plants. Bryophytes are a group of land plants phylogenetically positioned between vascular plants and streptophyte algae, which makes them indispensable in studying plant evolution. The bryophyte *Marchantia polymorpha* L. is a model liverwort species known for low redundancy of regulatory genes. In this thesis and the included publication, I explored the function of the single class I HDZ TF in *M. polymorpha* (Mp*C1HDZ*). I analysed the phenotype of Mp*c1hdz* mutants generated using CRISPR-Cas9 mutagenesis, which revealed the importance of Mp*C1HDZ* for oil body production, air pore size and gemma cup morphology. Oil bodies are liverwort-specific organelles containing diverse terpenoid compounds. Expressing a fluorescently tagged MpC1HDZ could rescue oil body-deficient phenotype of Mp*c1hdz* mutants. Using confocal time-lapse imaging, I observed that MpC1HDZ expression maxima precede the formation of oil bodies in oil body cells, suggesting that high Mp*C1HDZ* expression is an important step in oil body cell differentiation. Further experiments by collaborators demonstrated the importance of oil bodies and Mp*C1HDZ* for herbivore repellence. I also identified growth-related phenotypes of Mp*c1hdz* mutants: reduced air pore size, and loss of funnel-like gemma cup morphology. However, these latter phenotypes were not successfully complemented by Mp*C1HDZ* coding sequence despite being identified in independent mutant alleles. Consequently, additional experiments are needed to uncover the role of Mp*C1HDZ* in air chambers and gemma cups. Nevertheless, my results point towards a dual role of Mp*C1HDZ* in defence against biotic stress and in growth regulation. Therefore, Mp*C1HDZ* and *LMI1*-type genes from angiosperms were probably co-opted for different functions during land plant diversification but they may have retained similarity in some functional aspects.