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REGUATION MECANISM OF CELL ELONGATION AND CELL PROLIFERATION IN LEAF MORPHOGENESIS

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Plant morphogenesis is controlled by the integration of endogenous genetic programs and responses to exogenous signals. The leaf is a good subject for studying plant morphogenesis, the diversity of which is reflected in leaf shape. Early control of leaf shape relies on controlling leaf initiation at the shoot apical meristem (SAM), the rates and planes of cell division, and the polarity-dependent differentiation of leaf cells. Final leaf form involves coordination of the rates of division, enlargement, and differentiation of leaf cells. Recently, we showed that two genes of *Arabidopsis*, *ROT3* and *AN*, are responsible for the polarity-specific expansion of leaf cells. We found that the *ROT3* gene, which was specifically involved in the regulation of leaf length in *Arabidopsis*, was required for the late steps in the BR biosynthesis pathway. The results of the present study provide evidence that the *ROT3* and *ROT3* homolog, play distinct roles in organ-specific environmental regulation of the biosynthesis of BRs. In addition, we found that the *AN* gene, encodes CtBP homolg, which was specifically involved in the regulation of leaf width in *Arabidopsis*, was involved in the regulation of cortical microtubules. On the other hands, we found that several genes of *Arabidopsis*, such as *791B3* gene, were responsible for the regulation of cell proliferation in leaf elongation.

Recently, we identified that the factor that regulates genetic interaction between shoot meristem and differentiation of leaf organ. However, many of genes that regulate leaf development and differentiation are remained to be identified. Based on the results of our recent researches, we will discuss on the regulation of leaf shape, from the perspective of the spatial and temporal balance between cell proliferation, cell enlargement, and cell differentiation.