

論文の内容の要旨

Studies on the regulatory mechanism of leaf cell number and cell size focusing on
ANGUSTIFOLIA3
(*ANGUSTIFOLIA3*に焦点を当てた葉の細胞数および細胞サイズ制御機構の解明)

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Lateral organs in plants, such as leaves and floral organs, exhibit determinate growth in which the growth stops at a certain point. Cell number and cell size are two major determining factors of determinate organ size. In previous studies, it has been found that decreased cell number is often seen with increased cell size in leaves and petals. This phenomenon is called compensation, since enhanced cell expansion seems to compensate deficient cell proliferation. Compensation is seen in many mutants, transgenics, and natural variants, suggesting the coordination system between cell proliferation and cell expansion. Although many gene regulatory networks have been revealed for the cell proliferation process, the coordination system between cell proliferation and expansion has been less understood. I attempted to reveal a compensation mechanism by exploring factors involved in enhanced cell expansion, which is specifically called compensated cell enlargement, for further understanding of the organogenesis of determinate organs.

Compensation has been investigated mainly in leaves of *Arabidopsis thaliana* (L.) Heynh. It

has been suggested that compensation is a heterogeneous phenomenon, that is, it occurs through various pathways depending on cases. Among several compensation-exhibiting mutants, I focused on a function-deficient mutant of *ANGUSTIFOLIA 3* (*AN3*). *AN3* encodes a transcriptional coregulator which plays a significant role in cell proliferation promotion. *an3* mutant makes leaves with much less cell number and larger cells. *AN3* function and its interactors have been widely shown but its role in cell size regulation has not been known. Furthermore, factors inducing compensated cell enlargement in *an3* mutant has been remained to be elucidated to date.

In this study, I examined *extra-small sisters 2* (*xs2*) mutant, which has been isolated as an *an3* compensation suppressor. It has been known that *xs2* mutant shows smaller cell size and it negatively affects compensated cell enlargement in *an3* mutant. I investigated the effect of *xs2* mutation on usual leaf development as well as *an3* compensation. I also analyzed detailed processes of *an3* compensation and several factors which are possibly involved in compensated cell enlargement. As a result, I found some factors which are associated with compensated cell enlargement in *an3* mutant.