082(F105)

Analysis of *frl1* mutant that affects petal and sepal development in Arabidopsis

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We have isolated *frill1* (*frl1*) mutant that has serrated petals and sepals but the other floral and vegetative organs are normal. Previous observations revealed that the number of petal epidermal cells was decreased in the distal region of *frl1* petal, and that the cell size was variable and relatively larger than those in the wild type. Larger nuclei with varied sizes suggested that abnormal endo-reduplication had occurred in *frl1* petals. Observations of the early petal development revealed that the *frl1* phenotype became apparent at the floral stage 10. These results indicate that *FRL1* gene is required to attain the normal cell division and expansion in the petal development later than stage 10.

We are trying to isolate *FRL1* gene by a map-based cloning. *FRL1* is previously mapped to the upper part of chromosome1. Further mapping analysis showed that the *FRL1* is located in the 100kbp region that is covered with 2 overlapping BAC clones. There are 29 genes in this region, and the identification of *FRL1* gene is going on now.

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***SHORT VALVE*, an *Arabidopsis* gene involved in gynoecium development, encodes a ribosomal protein L24 homolog**

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The gynoecium of *Arabidopsis* is composed of four distinct regions, the stigma, the style, the ovary and the gynophore along the apical-basal axis. We have isolated a novel gynoecium mutant, *short valve* (*stv*), in which the basal parts of the ovary are replaced by the gynophore, resulting in the reduced size of the ovary. To investigate the genetic interaction with *pid*, *ett* and *fil*, whose phenotypes are similar to those of *stv*, we crossed *stv* to these mutants to generate the double mutants. These double mutants had the pin-like inflorescence without any flower buds. This suggests that the *STV* gene functions also in the formation of flower buds. The *STV* gene was cloned by T-DNA tagging and found to encode a ribosomal protein L24 homolog.

Expression analysis of the *STV* gene and creating transgenic plants constitutively expressing the *STV* gene are in progress.

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Functional analyses of the *PRS* gene, which expresses in the lateral regions of floral primordia and floral organs in *Arabidopsis*

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The *FIL* gene and the *AP1* gene are known to express in the abaxial and the adaxial regions of floral primordia, respectively. The positions of floral organs in a flower are determined depend on two direction: the abaxial-adaxial and the lateral. The mechanism is, however, not well understood.

pressed flower (*prs*) mutant has defects in the development of lateral sepals and margin of abaxial and adaxial sepals. The *PRS* gene encodes a putative transcriptional factor, which has a homeodomain. The *PRS* gene expresses in the lateral regions of floral primordia and floral organs. These suggests that the *PRS* gene is involved in the differentiation or division of the cells in the lateral regions of floral primordia and sepals.

We show the results of *prs fil* and *prs ap1* double mutants analyses and the expression analyses of these genes. In addition, we show the effects of the over expression of the *PRS* gene.

085(F108)

MOLECULAR CLONING OF *SPIRAL2*

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Recessive *spiral2* (*spr2*) mutants of *Arabidopsis thaliana* show constitutive right-handed helical growth in root, hypocotyl, petiole and petal. The direction of the epidermal helix was reverted from right-handed to left-handed when either microtubule-interacting drug, propyzamide or taxol, was added at low concentration in the agar medium. We propose that *SPR2* may control directional cell elongation by participating in a process that determines the orientation of cortical microtubule arrays. By a map-based approach we have cloned the *SPR2* gene which encodes a novel protein.