

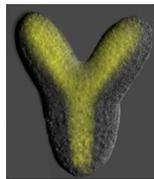
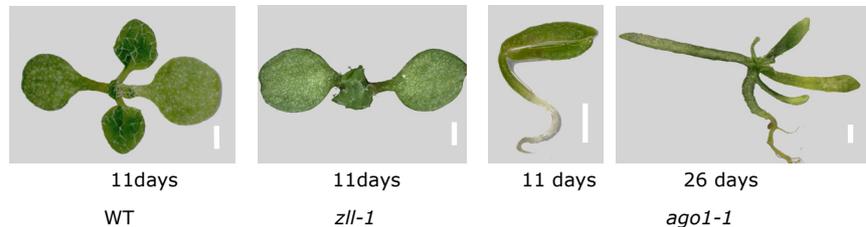
Specific function of ZWILLE in stem cell development

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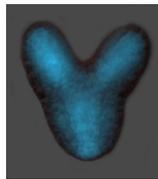
Argonaute (AGO) proteins play a role in transcriptional and translational gene silencing in plants and animals. There are ten AGO genes in *Arabidopsis* that function in diverse developmental processes. AGO1 is required for post transcriptional gene silencing and virus resistance¹. By contrast the closest *Arabidopsis* homolog ZWILLE (ZLL) plays a specific role in embryonic stem cell initiation². AGO proteins are defined by the presence of two functional domains; the PAZ domain that binds small RNA molecules and the PIWI domain with potential mRNA cleavage activity. During embryogenesis ZLL and AGO1 are partially redundant and act together to allow wild-type growth and gene expression patterns³. Here we address the functional specificity of ZLL in stem cell development.

Mutants:

In *zll* mutant seedlings the SAM (shoot apical meristem) terminates prematurely in differentiated apical cells or organs. The *ago1* mutation pleiotropically affects plant architecture and organ polarity⁴.



ZLL-YFP



AGO1-CFP

Expression:

In the embryo, ZLL is specifically expressed in the provascular cells and the adaxial side of the cotyledons. AGO1 expression in contrast is less restricted.

Although AGO1 and ZLL show an overlapping expression domain endogenous expression of AGO1 cannot compensate the loss of ZLL-activity in *zll* mutants.

Aim:

To identify domains mediating specificity of ZLL we constructed chimaeric AGO1/ZLL genes by domain swapping.



Col



AGO1:AGO1

AGO1:ZLL

ago1-27

Preliminary results:

Expression of ZLL from the AGO1 promoter can rescue the *zll-1* phenotype, but cannot rescue the *ago1-27* defects. By contrast, AGO1 expressed from its own promoter completely rescues *ago1-27*.

Outlook:

Despite their previously described partial redundancy in embryogenesis and their structural similarity our results indicate that ZLL and AGO1 proteins are functionally not equivalent. We will continue this analysis to reveal structural-functional relationship of AGO proteins and the specific requirements of ZLL in stem cell development.

References:

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- ²Moussian *et al.* (1998) *EMBO J.* 17, 1799-1809
- ³Lynn, K. *et al.* (1999) *Development* 126, 469-481
- ⁴Vaucheret *et al.* (2004) *Genes Dev.* 18, 1187-1197