

## Cytokinin and auxin interaction in root stem-cell specification during early embryogenesis.

By Bruno Müller and Jen Sheen, Department of Molecular Biology, Massachusetts General Hospital, Boston, Massachusetts 02114, USA.

### Abstract

Plant stem-cell pools, the source for all organs, are first established during embryogenesis. It has been known for decades that cytokinin and auxin interact to control organ regeneration in cultured tissue.

Auxin has a critical role in root stem-cell specification in zygotic embryogenesis, but the early embryonic function of cytokinin is obscure. Here, we introduce a synthetic reporter to visualize universally cytokinin output *in vivo*. Notably, the first embryonic signal is detected in the hypophysis, the founder cell of the root stem-cell system. Its apical daughter cell, the precursor of the quiescent center, maintains phosphorelay activity, whereas the basal daughter cell represses signaling output. Auxin activity levels, however, exhibit the inverse profile. Furthermore, we show that auxin antagonizes cytokinin output in the basal cell lineage by direct transcriptional activation of ARABIDOPSIS RESPONSE REGULATOR genes, ARR7 and ARR15, feedback repressors of cytokinin signaling. Loss of ARR7 and ARR15 function or ectopic cytokinin signaling in the basal cell during early embryogenesis results in a defective root stem-cell system. These results provide a molecular model of transient and antagonistic interaction between auxin and cytokinin critical for specifying the first root stem-cell niche.

### References

Müller, B., & Sheen, J. (2008). Cytokinin and auxin interaction in root stem-cell specification during early embryogenesis. [\*Nature\*, 453\(7198\), 1094-1097.](#)