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CLE peptide as a positive regulator of plant stem cell identity

Overall morphology of shoot systems relies on the activity of shoot apical meristems at the tips of plant bodies. Each meristem maintains a pool of stem cells at the center, surrounded by differentiating daughter cells. In the flowering plant *Arabidopsis thaliana*, the stem cell population is maintained at a constant size by the canonical CLV3-WUS feedback loop. To understand the evolutionary origin of this cell signaling system, we study MpCLE2, the sole CLV3 ortholog in the liverwort *Marchantia polymorpha*. We show that treatment with MpCLE2 peptide resulted in the accumulation of undifferentiated cells, marked by MpYUC2 expression, in the apical meristem. Removal of MpCLE2 peptide resulted in supernumerary branching from the accumulated cells, demonstrating that MpCLE2 positively regulates stem cell identity in *M. polymorpha*, in sharp contrast to the stem cell-limiting activity of CLV3 in flowering plants. We are now trying to elucidate the mechanisms of the inversion of the CLE/CLV3 peptide activity on stem cells during the evolution of land plants.

