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Title:	Plant stem cell maintenance involves direct transcriptional repression of differentiation program
Authors:	Yadav, R.K. (/jspui/browse?type=author&value=Yadav%2C+R.K.)
Keywords:	Animal systems Transcription factors Transcriptional
Issue Date:	2013
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Abstract:	In animal systems, master regulatory transcription factors (TFs) mediate stem cell maintenance through a direct transcriptional repression of differentiation promoting TFs. Whether similar mechanisms operate in plants is not known. In plants, shoot apical meristems serve as reservoirs of stem cells that provide cells for all above ground organs. WUSCHEL, a homeodomain TF produced in cells of the niche, migrates into adjacent cells where it specifies stem cells. Through high-resolution genomic analysis, we show that WUSCHEL represses a large number of genes that are expressed in differentiating cells including a group of differentiation promoting TFs involved in leaf development. We show that WUS directly binds to the regulatory regions of differentiation promoting TFs; KANADI1, KANADI2, ASYMMETRICLEAVES2 and YABBY3 to repress their expression. Predictions from a computational model, supported by live imaging, reveal that WUS-mediated repression prevents premature differentiation of stem cell progenitors, being part of a minimal regulatory network for meristem maintenance. Our work shows that direct transcriptional repression of differentiation promoting TFs is an evolutionarily conserved logic for stem cell regulation.
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