



IIT ROORKEE



NPTEL ONLINE
CERTIFICATION COURSE

Root Development..cont.

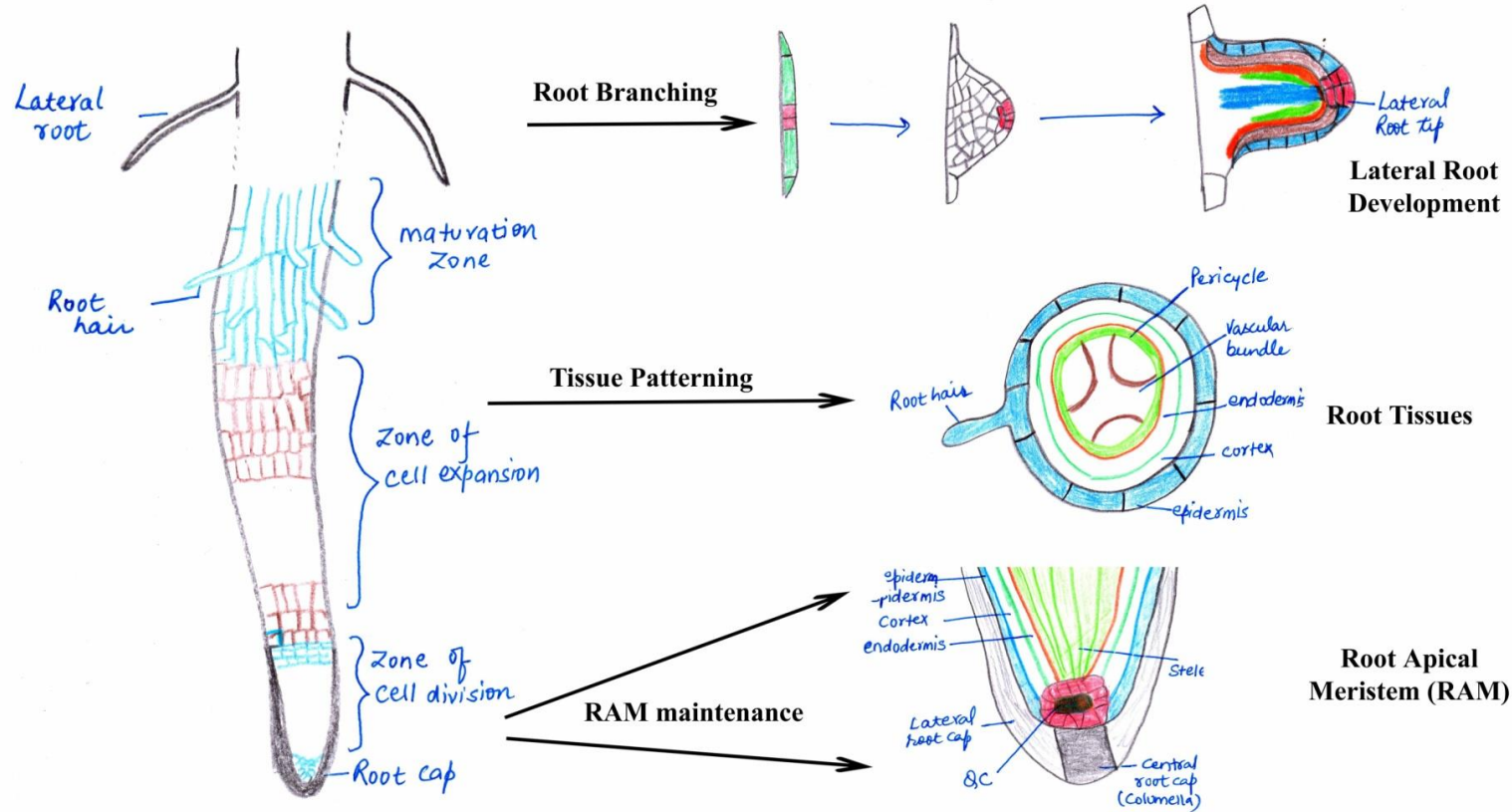
Dr. Shri Ram Yadav

Department of Biotechnology

Indian Institute of Technology, Roorkee



Root System & Development



RAM Maintenance & Differentiation

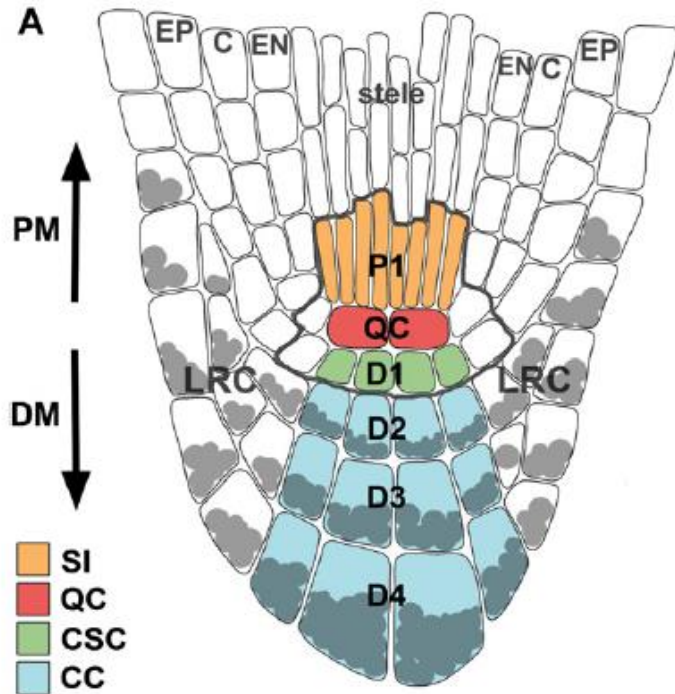


Image Source: Stahl et al. (2009),
Current Biology 19, 909–914.

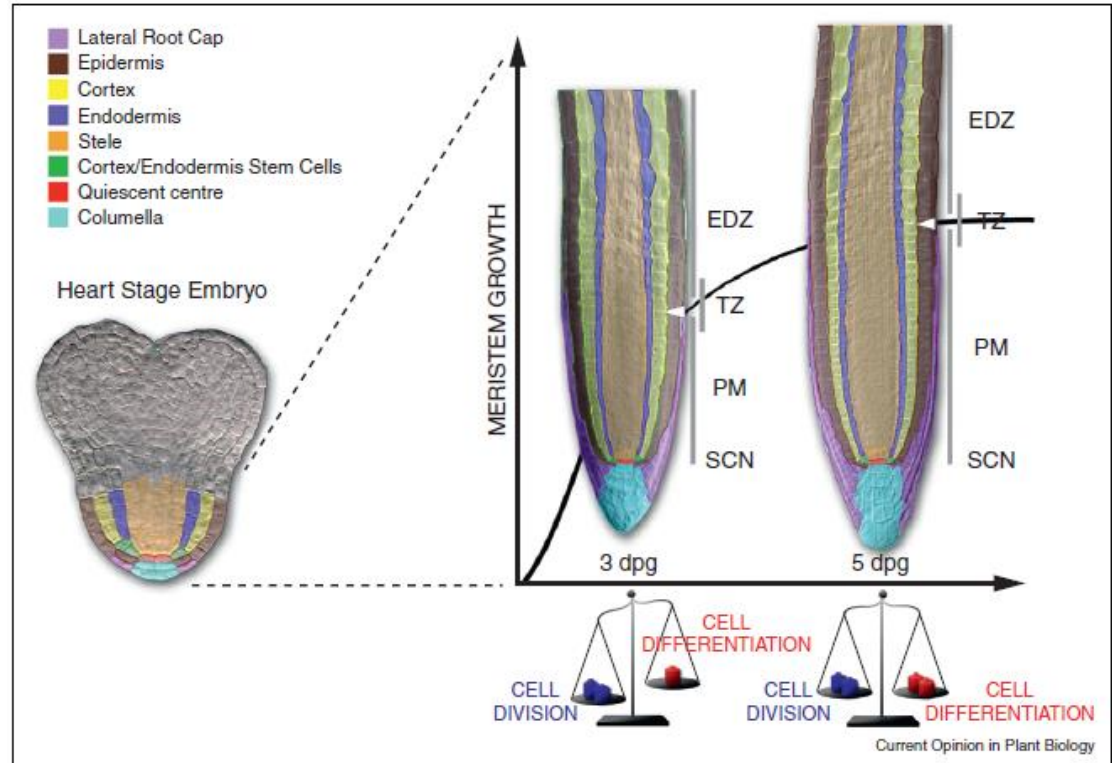


Image Source: Perilli et al. (2012), Curr Opin Plant Biol., 15, 17-23.

Asymmetric Cell Division (ACD): first step of differentiation

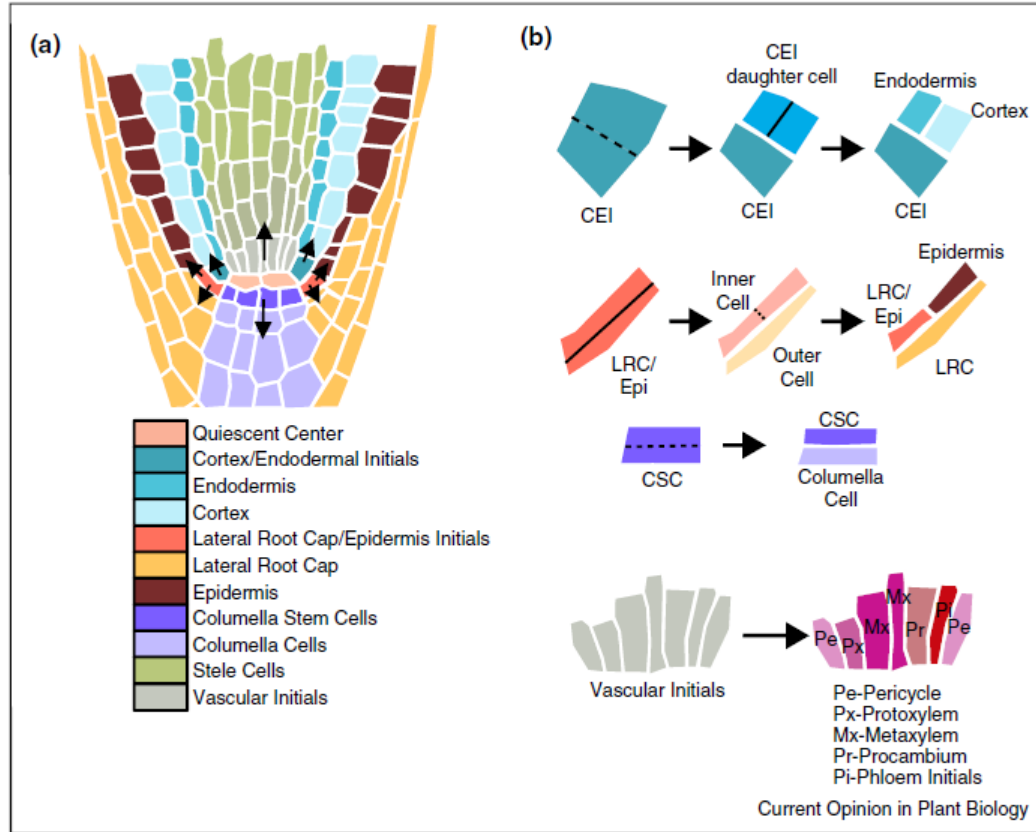


Image Source: Fisher and Sozzani (2016),
Curr Opin Plant Biol., 29, 38-43.

Asymmetric Cell Division (ACD) of CEI

A Bistable Circuit Involving SCARECROW-RETINOBLASTOMA Integrates Cues to Inform Asymmetric Stem Cell Division

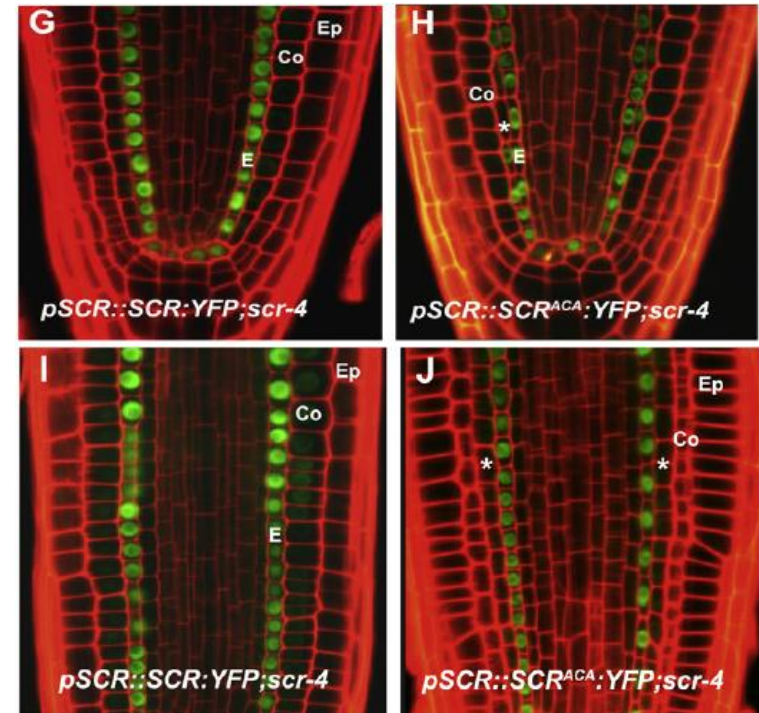
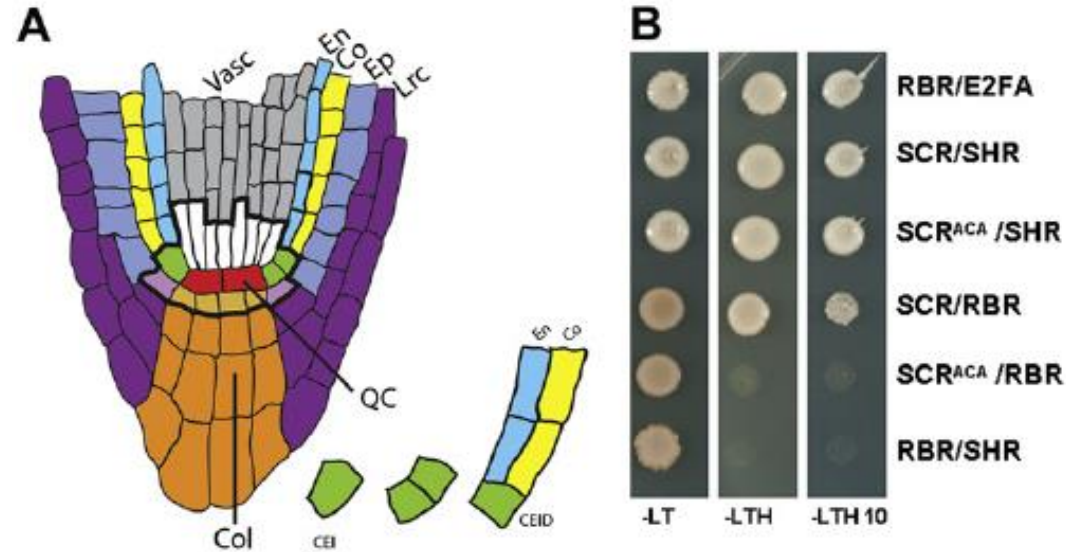


Image Source: Cruz-Ramírez et al. (2012), Cell, 150, 1002-15.

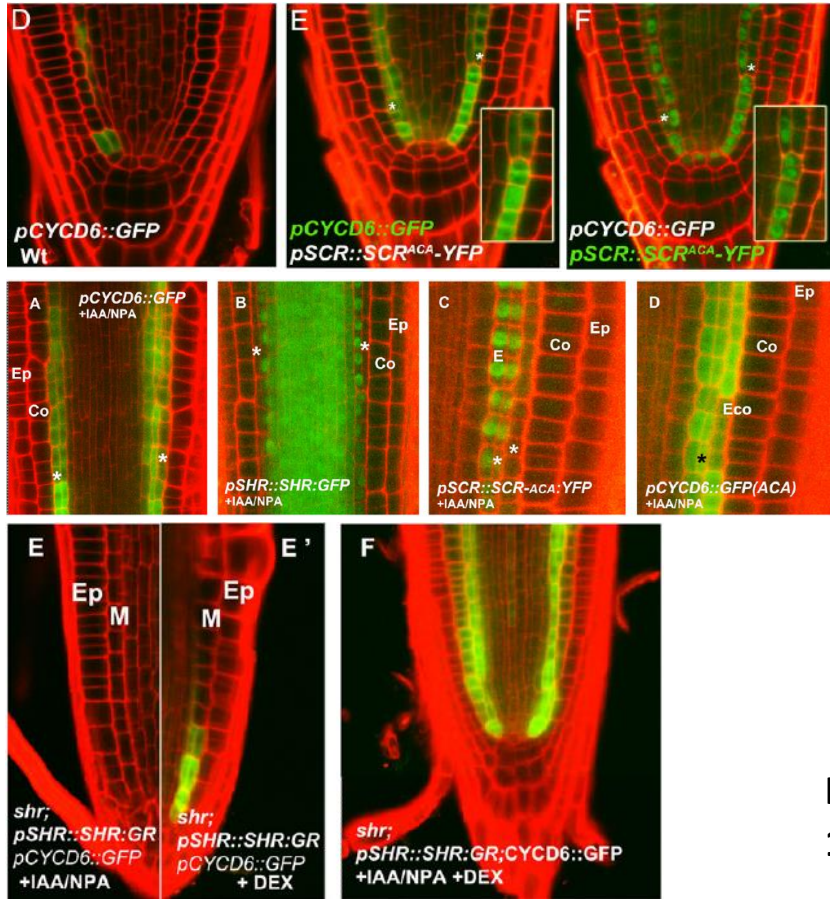


Image Source: Cruz-Ramírez et al. (2012), Cell, 150, 1002-15.

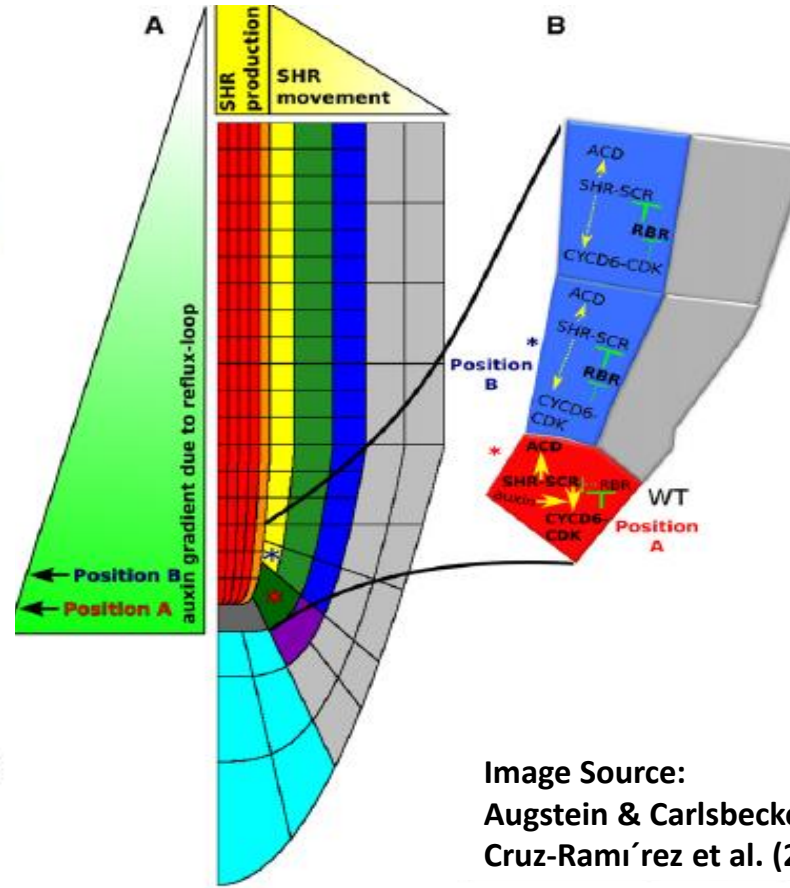
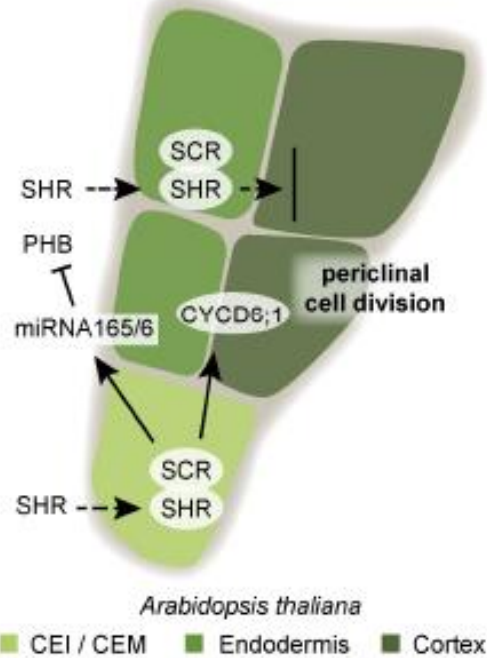


Image Source:

Augstein & Carlsbecker (2018), *Front. Plant Sci.* 9:1410.
Cruz-Ramírez et al. (2012), *Cell*, 150, 1002-15.

Asymmetric Cell Division (ACD) of stem cells: Epi/LRC

The NAC Domain Transcription Factors FEZ and SOMBRERO Control the Orientation of Cell Division Plane in *Arabidopsis* Root Stem Cells

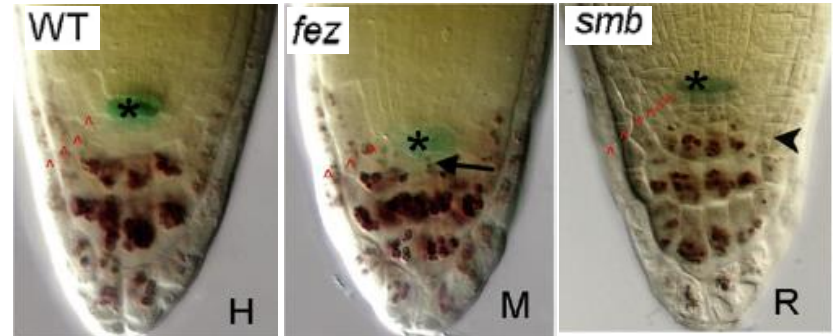
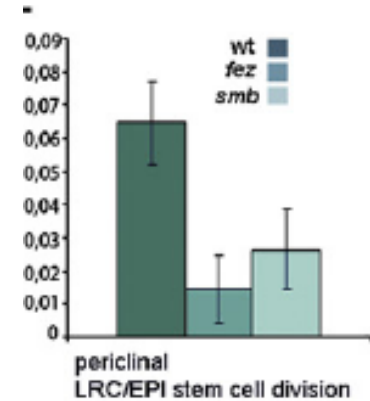
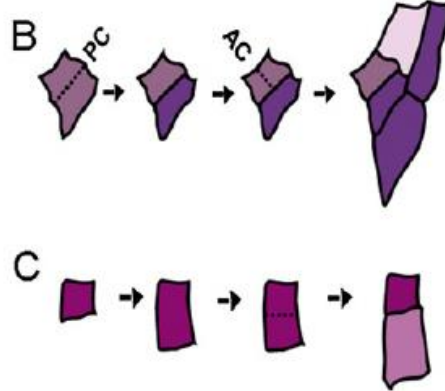
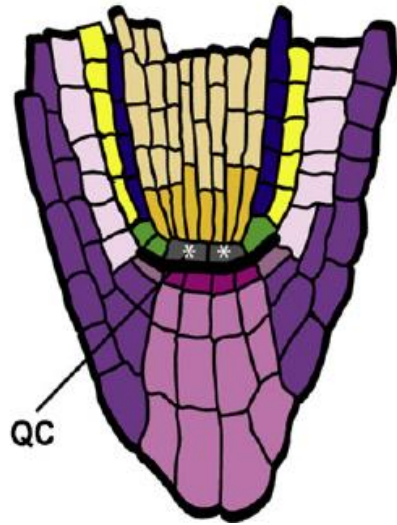


Image Source: Willemsen et al. (2008), Developmental Cell 15, 913–22.

Asymmetric Cell Division (ACD): COL

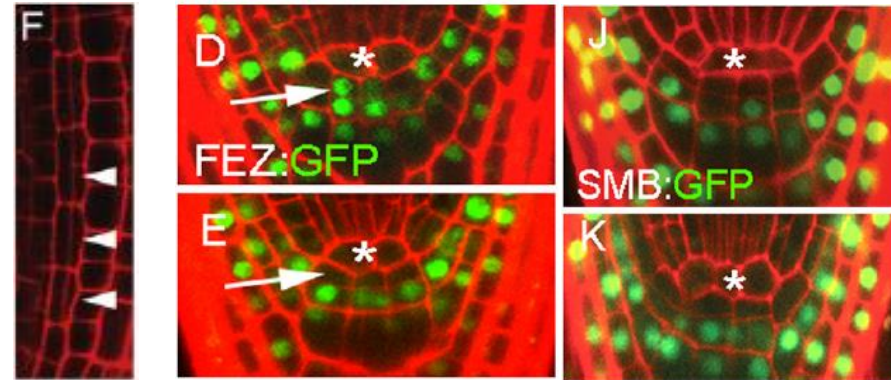
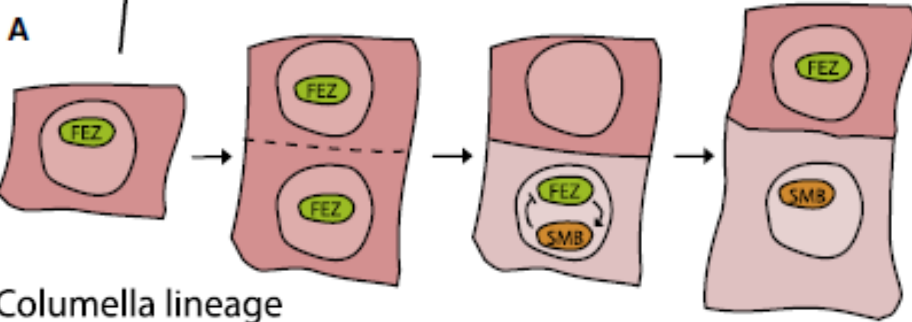
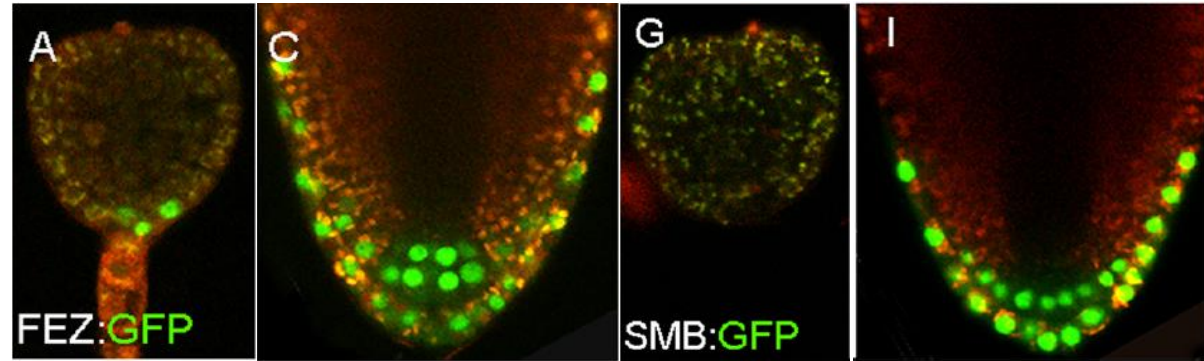
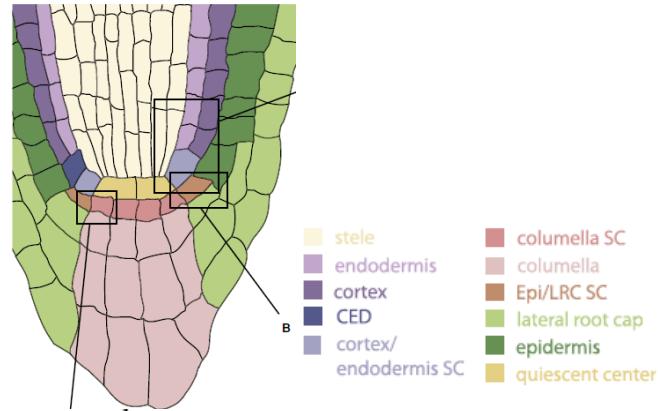


Image Source: Willemssen et al. (2008), Developmental Cell 15, 913–22.

Auxin Regulates Root Cap Formation

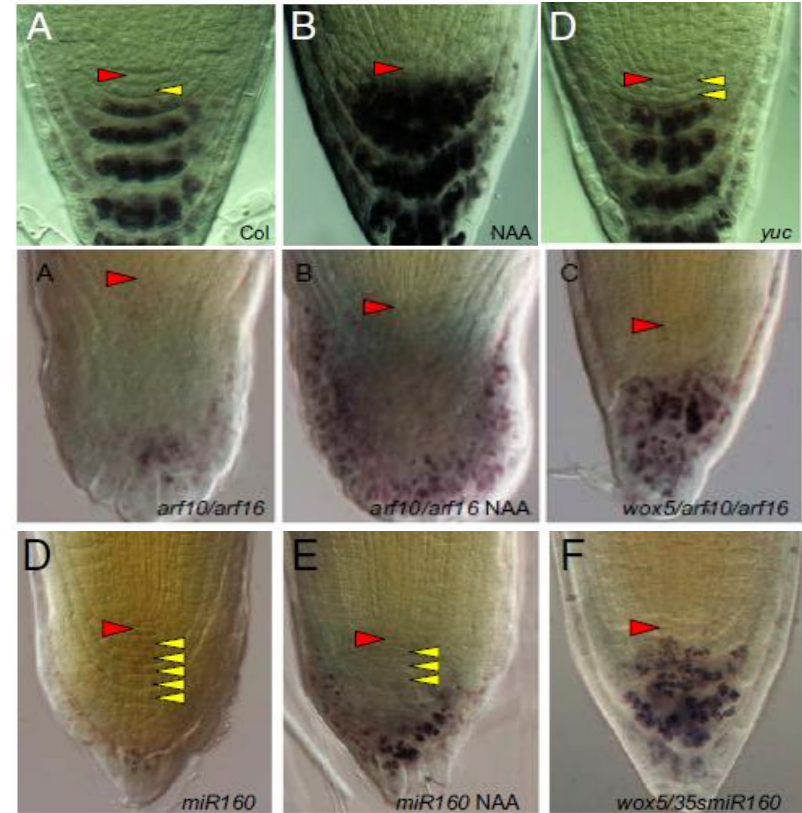
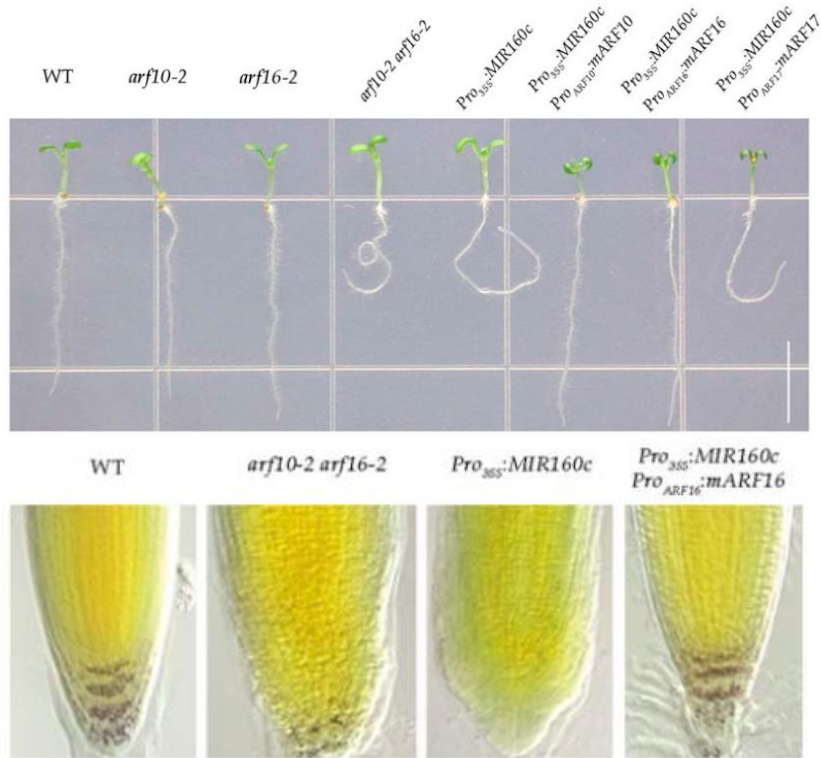
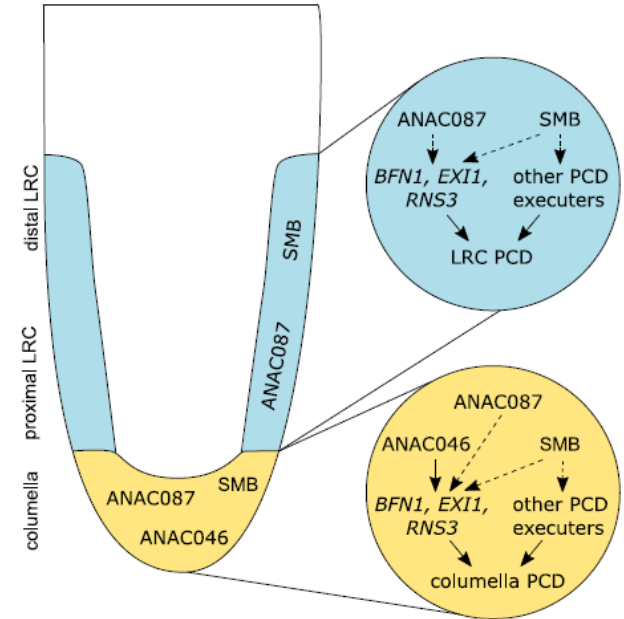
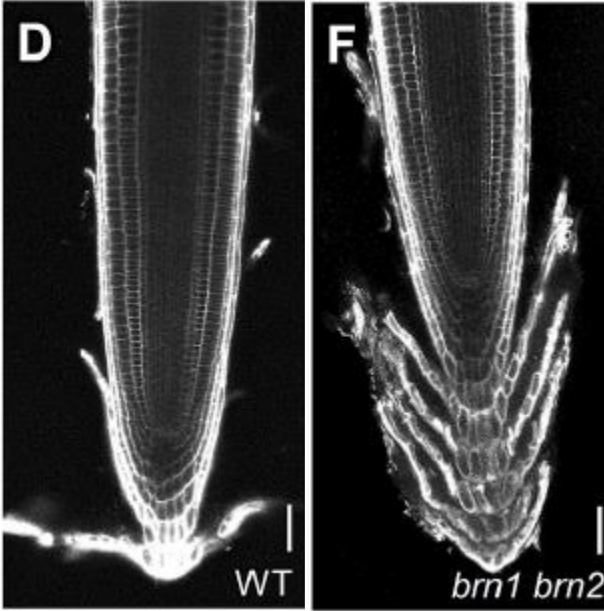


Image Source: Wang et al. (2005) *Plant Cell*, 17, 2204–16.
Ding & Friml (2010), *PNAS*, 107, 12046–51.

A



Precise control of plant stem cell activity through parallel regulatory inputs

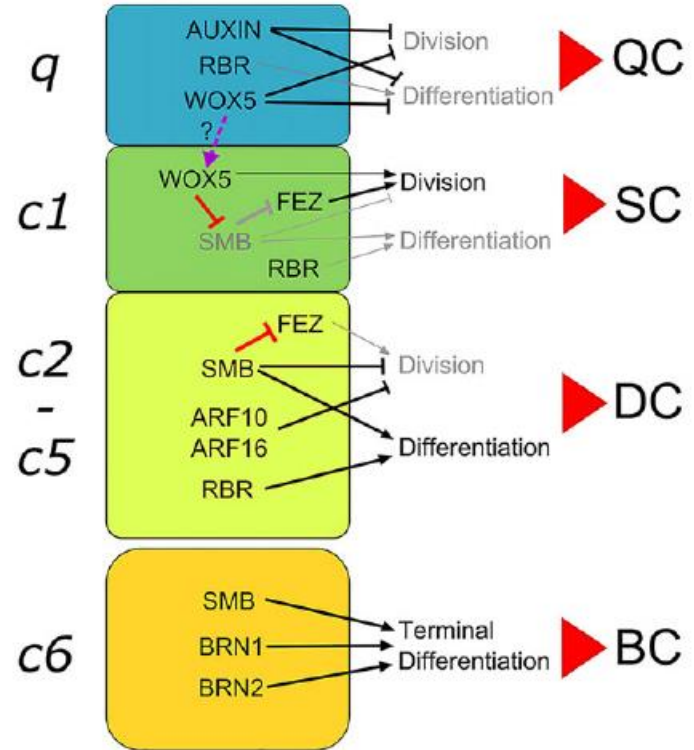
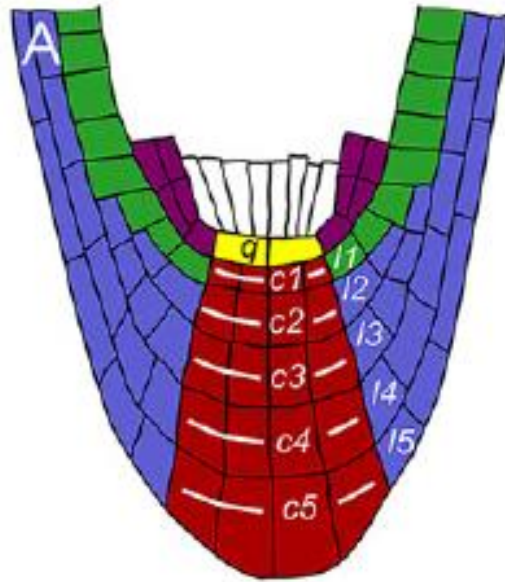
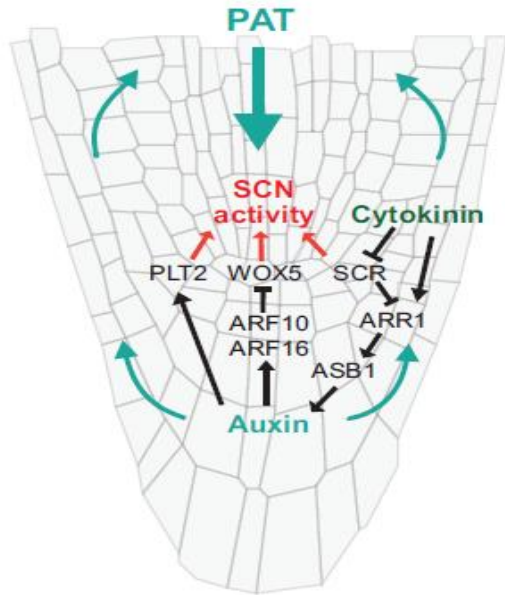


Image Source: Gailloch et al. (2015), *Development*, 142, 2237-49.
Bennett, van den Toorn et al. (2014), *Development*, 141, 4055-64.