

CLE signaling promotes root meristem maintenance and regeneration

Indeterminate growth of the root relies on the root apical meristem (RAM), which is maintained by its quiescent center (QC). The QC undergoes highly regulated divisions to maintain adjacent stem cells, and if the QC and its surrounding cells are heavily damaged or removed the youngest remaining cells will regenerate the RAM. Previously we found that cell-to-cell mobile CLAVATA3/ENDOSPERM SURROUNDING REGION-LIKE (CLE) peptides signal through BARELY ANY MERISTEM (BAM) BAM1 and 2 to promote QC divisions. Here we show that CLE signaling through BAM1/2 is required for QC divisions via regulation of QC-active D-type cyclin expression. Moreover, single-nuclear RNA sequencing has indicated that BAM1/2 are necessary for proper regulation of cell divisions in the root stem cell niche. Finally, we found that CLE signaling through BAM1/2 is required for proper RAM regeneration, and that this may require specific CLE peptides. Altogether this work provides novel insights into how CLE signaling regulates RAM maintenance, and how it may be modulated to facilitate regeneration.