Pamplona
26-28 de junio de 2019

Fisiología Vegetal

2019

XXIII Reunión Sociedad Española de Fisiología Vegetal | XVI Spanish Portuguese Congress of Plant Physiology

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P192 Identification of polarization cues downstream of POTENT involved in asymmetric cell division of lateral root founder cells

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Plants show a postembryonic mode of development with most organs being made after embryogenesis. Root system establishment requires formation of lateral roots (LR), being the hormone auxin a key player promoting their formation. LR formation involves positioning of cells competent (prebranch sites) to form LR through oscillatory gene activiy[1]. Subsequently, cells within prebranch-sites are reprogrammed to become LR founder cells (FC). LR initiation starts with asymmetric cell division (ACD) of FCs to eventually give rise to the different cell lineages that make up the root[23]. ACD is therefore crucial to LR formation and involves polarization of FCs resulting in nuclear migration. How polarization of FCs is established is unknown.
Nuclear migration involves auxin signaling and some downstream factors have been identified[3]. Auxin signaling involves the ubiquitin-mediated degradation of the AUXIN/INDOLE-3-ACETIC ACID (Aux/IAA) transcriptional co-regulators via proteasome[3]. We have identified a mutant defective in lateral root formation called *potent*. *Potent* mutation prevents degradation of an Aux/IAA factor by auxin resulting in inhibition of auxin signaling. As a consequence, over-specification of prebranch-sites and FCs along the root occur. In addition, FCs in *potent* divide symmetrically generating daughter cells of similar sizes and incorrect cells fates. Furthermore, these daughter cells remain blocked in development and cannot form LRs. We aim to identify polarization cues downstream of POTENT involved in ACD of FCs. For this purpose, we have generated a *potent* inducible line -by estradiol- and introgressed the FC marker SKP2B to monitor specification and ACD division. Our results show that *potent* factor dose correlates with FC specification and number of LRs. Higher assessed doses of estradiol caused all pericycle to become FC and preventing LR formation. Upon auxin treatment, FCs remained blocked in development although symmetric divisions were observed indicating that POTENT must control most polarization cues required for ACD. We have performed protoplasting followed by Fluorescent Activated Cell Sorting (FACS) and isolated FCs in the *potent* inducible line. We will perform RNA sequencing of these cells to identify polarization cues regulated by POTENT.

1. Moreno-Risueno MA, Van Norman JM, Benfey, P. N. Oscillating Gene Expression Determines Competence for Periodic Arabidopsis Root Branching . *Science (80-.).* **329,** 1306–1311 (2010).
2. Dubrovsky, J. G., Doerner, P. W., Colón-Carmona, A. & Rost, T. L. Pericycle Cell Proliferation and Lateral Root Initiation in Arabidopsis. *Plant Physiol.* **124,** 1648–1657 (2002).
3. Trinh, C. D., Laplaze, L. & Guyomarc'h, S. *Lateral Root Formation: Building a Meristem de novo . Annual Plant Reviews online* **1,** (2018).

This work was supported by a grant from Ministerio de Economía y Competitividad (MINECO) of Spain to M.A.M.-R (BFU2016-80315-P). E.B.A. was supported by a YEI grant from European Social Fund (ESF)(PEJ-2017-AI/BIO-7360)