

## **Cell-wall remodeling and vesicle trafficking mediate the root clock in Arabidopsis**

### Abstract

In Arabidopsis, lateral roots initiate along the primary root in a process preceded by periodic gene expression, a phenomenon known as the lateral root clock. Many genes involved in lateral root initiation have been identified. However, very little is known about the structural changes underlying this process nor about how the clock is regulated. Using a forward genetic approach, we identified the vesicle trafficking regulators, GNOM and AGD3, as critical to lateral root clock function and lateral root primordia formation. We show that GNOM is required for proper distribution of de-esterified pectin while manipulation of pectin esterification leads to complete loss of the lateral root clock and lateral root formation. We found that lateral root primordia are associated with reduced levels of de-esterified pectins, which is known to enhance intercellular adhesion. These results suggest that remodeling of pectin esterification state in the cell-wall plays a role in regulating the lateral root clock and acquiring competence to form lateral root primordia.