

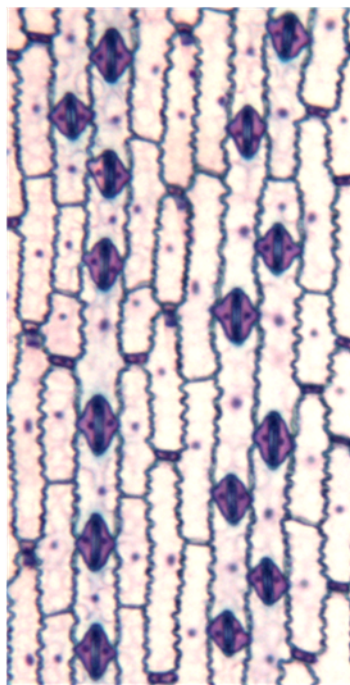
Biology Seminar

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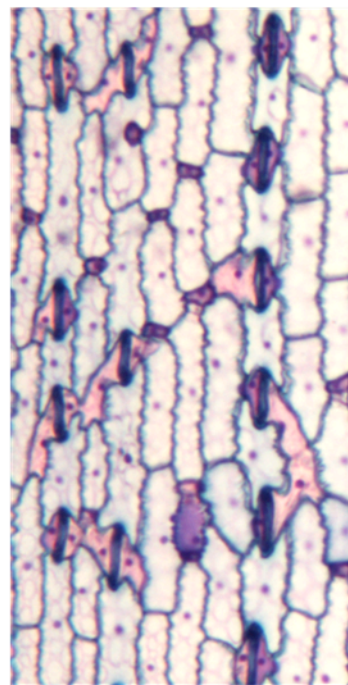
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Controlling Division Plane Orientation in Plant Cells

In plants, cell wall placement at cytokinesis is determined by the position of the preprophase band (PPB) and the subsequent expansion of the phragmoplast, which deposits the new cell wall, to the cortical division site delineated by the PPB. New cell walls are often incorrectly orientated during asymmetric cell divisions in the leaf epidermis of the *discordia* (*dcd1*, *dcd2*, and *dcd3*) maize mutants. Cloning of *dcd1* showed that it encodes an orthologue of the *Arabidopsis fass/ton2* gene, a putative B'' regulatory subunit that targets the serine/threonine phosphatase PP2A to appropriate substrates. We identified an additional gene, *alternative discordia1* (*add1*) in the maize genome, which encodes a protein 96% identical to DCD1. The inbred line A619 was identified as an *add1* mutant but does not have a noticeable phenotype. *dcd1*; *add1* RNAi lines and double mutants have abnormal division planes and fail to form PPBs in both symmetrically and asymmetrically dividing cells. An antibody that recognizes DCD1 and ADD1 localizes these proteins to PPBs and, more surprisingly, the cortical division site that remains after PPB breakdown. Considered all together, these experiments suggest that phosphatase activity regulated by DCD1/ADD1 is needed for PPB formation and cortical division site establishment.



wild type



dcd1