Plant Physiology®

May 2014 • Vol. 165 • No. 1

The electronic form of this issue, available as of May 6, 2014, at www.plantphysiol.org, is considered the journal of record.

On the Cover: Cell walls constitute complex composites of macromolecules that are of profound importance to the life of plant cells. Synthesized and secreted by highly dynamic biosynthetic machinery, the polymeric constituents must be accurately deposited into the microarchitecture of the wall in order for it to function competently. Presently, these structural and developmental properties, especially as they contribute to interactive polymeric networks in the wall, are poorly resolved. In this issue, Domozych et al. (pp. 105–118) employ the unicellular charophyte green alga, *Penium margaritaceum*, to investigate pectin architecture and dynamics in the cell wall. The outer layer of the wall is comprised of homogalacturonan fibrils that form dense aggregates that organize into a distinct outer lattice. Changes to lattice architecture may be directly monitored in live cells grown under different experimental conditions. This includes variations in levels of cations (e.g. calcium), exogenous pectin, pectin methylesterase, and pectate lyase. Pectin deposition is focused at a thin band at the cell isthmus and is part of a wall expansion mechanism that occurs in a distinct bidirectional fashion. These results highlight the efficiency of *P. margaritaceum* as a unicellular model organism for cell wall studies and provide new insight into pectin-based functions, including adhesion and cell shape maintenance. The cover shows the outer pectin lattice of the cell wall labeled with the anti-homogalacturonan monoclonal antibody, LM18. Cover image credits: David Domozych.

ON THE INSIDE

BREAKTHROUGH TECHNOLOGIES

RESEARCH REPORTS

RESEARCH ARTICLES

BIOCHEMISTRY AND METABOLISM

Continued on next page

Continued from preceding page

Continued on next page

Continued from preceding page

CELL BIOLOGY

GENES, DEVELOPMENT, AND EVOLUTION

Continued on next page

Continued from preceding page

Continued on next page

Continued from preceding page

Continued on next page

Continued from preceding page

[C] Some figures in this article are displayed in color online but in black and white in the print edition.
[W] The online version of this article contains Web-only data.
[OPEN] Articles can be viewed online without a subscription.