

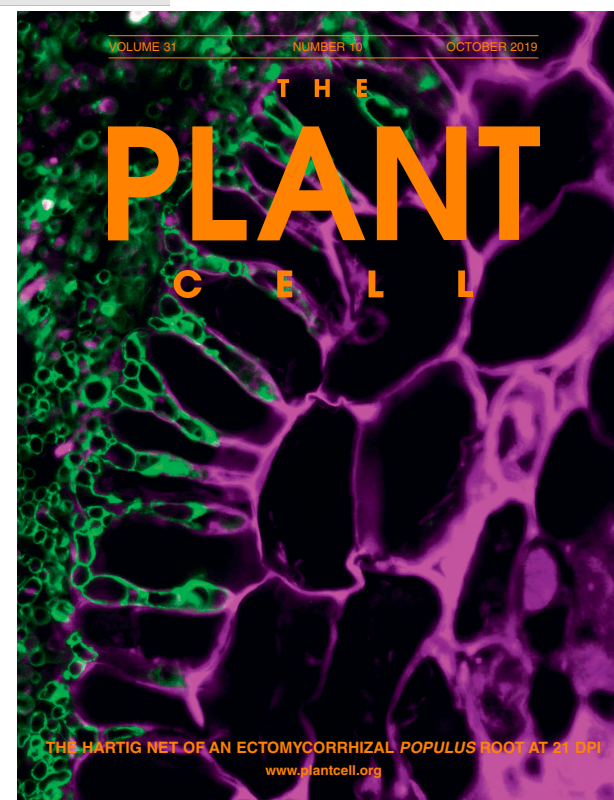
# Foundational Genomics Research, PMI SFA

## High Impact Publication: Lipochitooligosaccharides and their role in ectomycorrhizal fungal symbiosis

Objective	<ul style="list-style-type: none"> <li>To understand the molecular mechanisms underlying the symbiotic relationship between the ectomycorrhizal fungus, <i>Laccaria bicolor</i>, and the plant host, <i>Populus</i>.</li> <li>To investigate the role of lipochitooligosaccharides (LCOs) and the common symbiosis pathway (CSP) in this symbiotic relationship.</li> </ul>
New science	<ul style="list-style-type: none"> <li>The CSP is used by three beneficial plant-microbe associations, the arbuscular mycorrhiza, rhizobia-legume, and actinorhizal fungi, but has not been shown for the ectomycorrhizal fungus, <i>Laccaria bicolor</i>.</li> <li><i>Laccaria bicolor</i> produces an array of LCOs that can trigger both lateral root hair branching and nuclear calcium spiking in <i>Populus</i>, which implicates involvement of the CSP.</li> <li><i>Laccaria bicolor</i> produces both sulfated and non-sulfated LCOs (sLCOs and nsLCOs, respectively). We found that the sLCOs enhance ectomycorrhizal colonization, and that the nsLCOs trigger an increase in lateral root development.</li> <li>Both nsLCOs and sLCOs affect mantel and Hartig Net formation after fungal colonization verifying that the CSP is used in colonization.</li> </ul>
Impact	<ul style="list-style-type: none"> <li>This study demonstrates for the first time that the common symbiosis pathway is used in ectomycorrhizal symbiosis.</li> <li>A better understanding of this molecular mechanism can facilitate engineering of beneficial plant-microbe associations as needed for sustainable bioenergy feedstock production.</li> </ul>

The ectomycorrhizal fungus *Laccaria bicolor* produces lipochitooligosaccharides and uses the common symbiosis pathway to colonize *Populus* roots

Cope KR, Bascaules A, Iving TB, Venkateshwaran M, Maeda J, Garcia K, Rush TA, Ma C, Labbé J, Jawdy S, et al. (2019). *Plant Cell*, doi: 10.1105/tpc.18.00676.



Cover Photo of the October issue of "The Plant Cell" Journal showing the Hartig Net of an ectomycorrhizal *Populus* root at 21 days post inoculation with *Laccaria bicolor*.