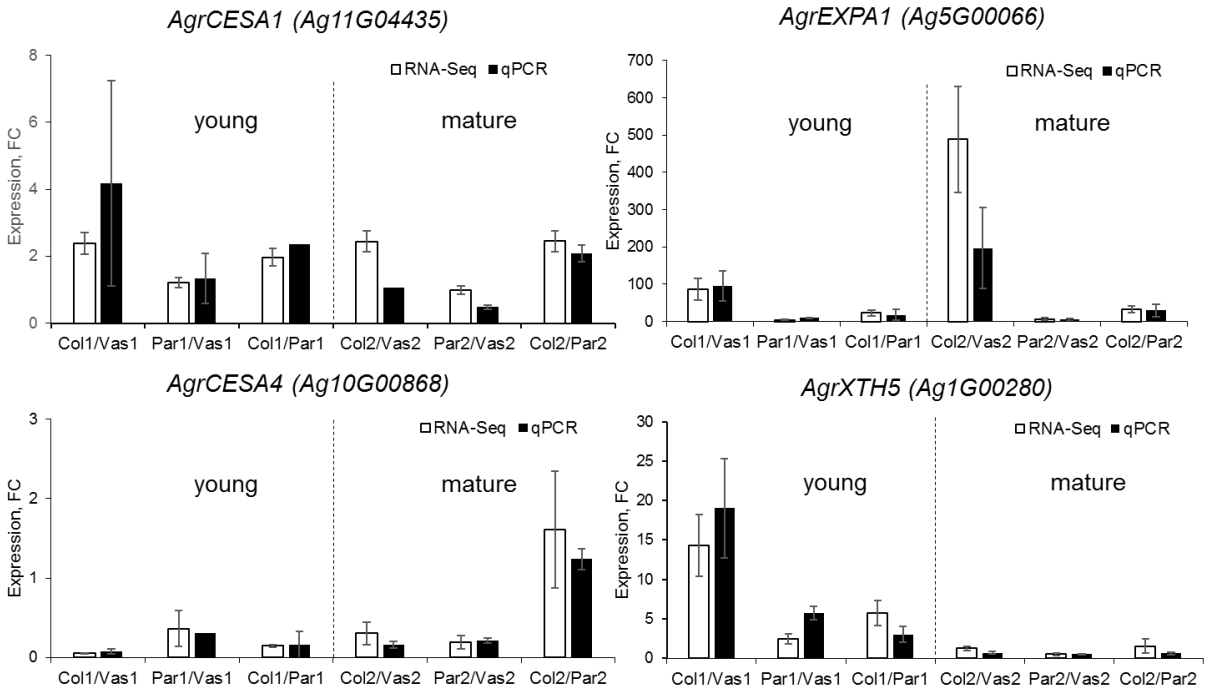


Gene Name	Gene ID	AT ortholog	Primer Sequence 5'-3'	Gene description
AgrEF_TU	*Ag9G01513*	*AT5G10630*	F: GCGGTACTGGAGGTGGTTAC	Elongation factor Tu
			R: ACCCTTCCCAGAGGCTTACT	
AgrCESA1	*Ag11G04435*	*AT4G32410*	F: AGTTGGTTCGGATTCGCCAT	Cellulose synthase A1
			R: AATCCTTTAGGGGCTTGGGC	
AgrCESA4	*Ag10G00868*	*AT5G44030*	F: CTTACCTCGATCGCCTGTCC	Cellulose synthase A4
			R:GCACCCACCTCCTAGCAAAT	
AgrXTH5	*Ag1G00280*	*AT5G13870*	F: GAAGACGGACTGGTCCAAGG	Xyloglucan endotransglucosylase/hydrolase 5
			R: TTCACTGACGACTCGCATCC	
AgrEXP10	*Ag5G00066*	*AT1G26770*	F: GCACTGAGCACAGCATTGTT	Expansin A10
			R: GTGATTGTACCACGGAGGCA	

Figure S1. A comparison of gene expression levels determined by RNA-Seq and qRT-PCR. Error bars show the standard error of the mean (n=3-4). The gene list and primer sequences are given in the table. Col – collenchyma, Par – parenchyma, Vas – vascular bundle.

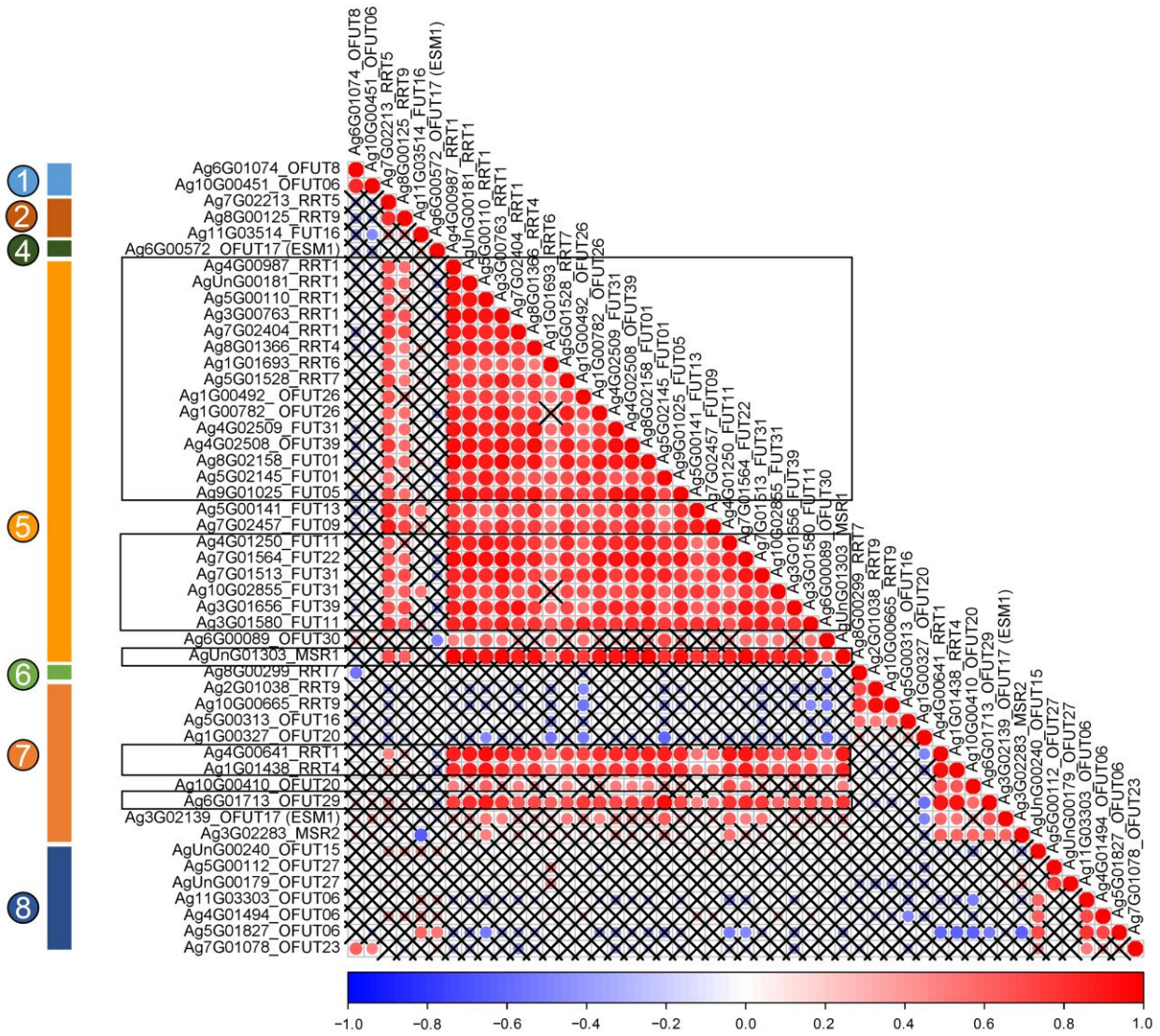
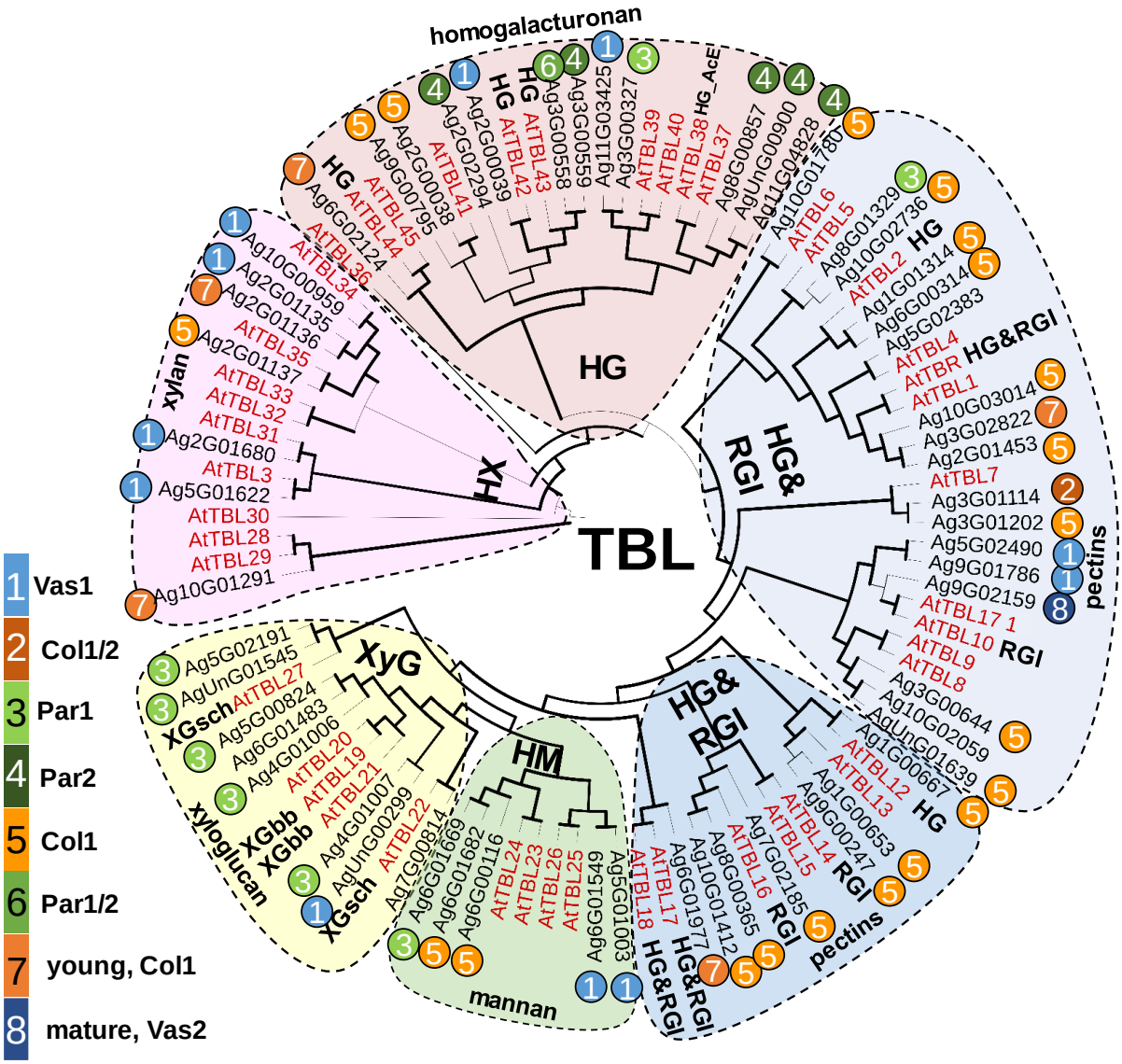


Figure S2. Correlation of expression of *GT106* genes in celery petiole tissues. Genes that are positively coexpressed with others are marked by red dots, while those that are negatively coexpressed are marked by blue dots. The size and color of the dots reflect the absolute value of Pearson's correlation coefficient (p<0.01; insignificant p-values are marked with X, Table S5). Black frames indicate coexpressed genes that were upregulated in young collenchyma, and this set was used for further coexpression analysis presented in Figure 9. On the left, the color panel and circles correspond to the clustering of genes for cell wall-related proteins presented in Figure 7.


homogalacturonan
HG
HG
HG

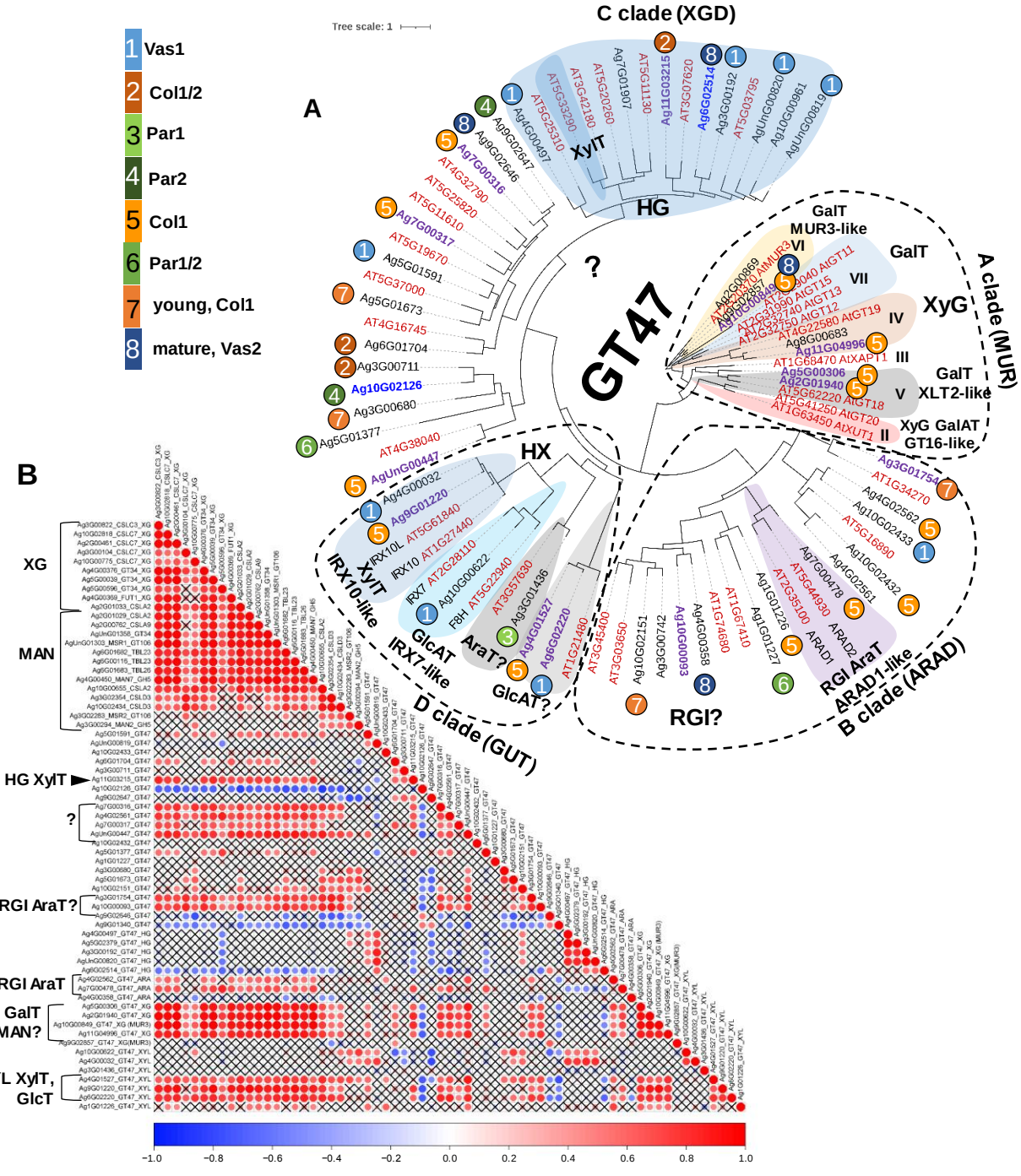


Figure S4. (**A**) Phylogeny of celery (black) and Arabidopsis (red) glycosyltransferase 47 family (GT47) protein sequences. The model of substitution WAG+F+I+R6, ultrafast bootstrap support 10,000. Known substrate specificity and activity are indicated in circles near the appropriate clade. The clade annotation was based on [70]. Violet or blue fonts on the tree denote genes that significantly positively or negatively coexpressed with genes for XyG and mannan-related proteins, respectively (B). Cluster numbers are designated near the appropriate gene. Polysaccharides: XyG – xyloglucan, RGI – rhamnogalacturonan I, HM – heteromannan, HX – heteroxylan, and HG – homogalacturonan. GT activities: GalT –galactosyltransferase, GalAT – galacturonosyltransferase, AraT – arabinosylransferase, XylT – xylosyltransferase, and GlcAT – glucuronosyltransferase. Xylosyltransferase activity was experimentally confirmed for AT5G33290 and predicted for other sequences in the clade [110]. (**B**) Correlation of expression of GT47 genes with genes encoding enzymes involved in xyloglucan (XyG) and heteromannan (HM) biosynthesis. Genes that are positively coexpressed with others are marked by red dots, while those that are negatively coexpressed are marked by blue dots. The size and color of the dots reflect the absolute value of Pearson's correlation coefficient (p<0.01; insignificant p-values are marked with X, Table S5). The color panel and circles correspond to the clustering of genes for cell wall-related proteins presented in Figure 7. Col – collenchyma, Par – parenchyma, Vas – vascular bundle.

References are numbered in accordance with the main text.

70. Mikkelsen, M.D.; Harholt, J.; Ulvskov, P.; Johansen, I. E.; Fangel J.U; Doblin, M.S.; Bacic, A.; Willats, W.G.T. Evidence for Land Plant Cell Wall Biosynthetic Mechanisms in Charophyte Green Algae. *Ann Bot.* **2014**, *114* (6), 1217–1236. https://doi.org/10.1093/aob/mcu171.

110. Jensen, J.K.; Sørensen, S.O.; Harholt, J.; Geshi, N.; Sakuragi, Y.; Møller, I.; Zandleven, J.; Bernal, A.J.; Jensen, N.B.; Sørensen, C.; Pauly, M.; Beldman, G.; Willats, W.G.T.; Scheller, H.V. Identification of a Xylogalacturonan Xylosyltransferase Involved in Pectin Biosynthesis in Arabidopsis. *Plant Cell* **2008**, *20*(5), 1289–1302. https://doi.org/10.1105/tpc.107.050906.

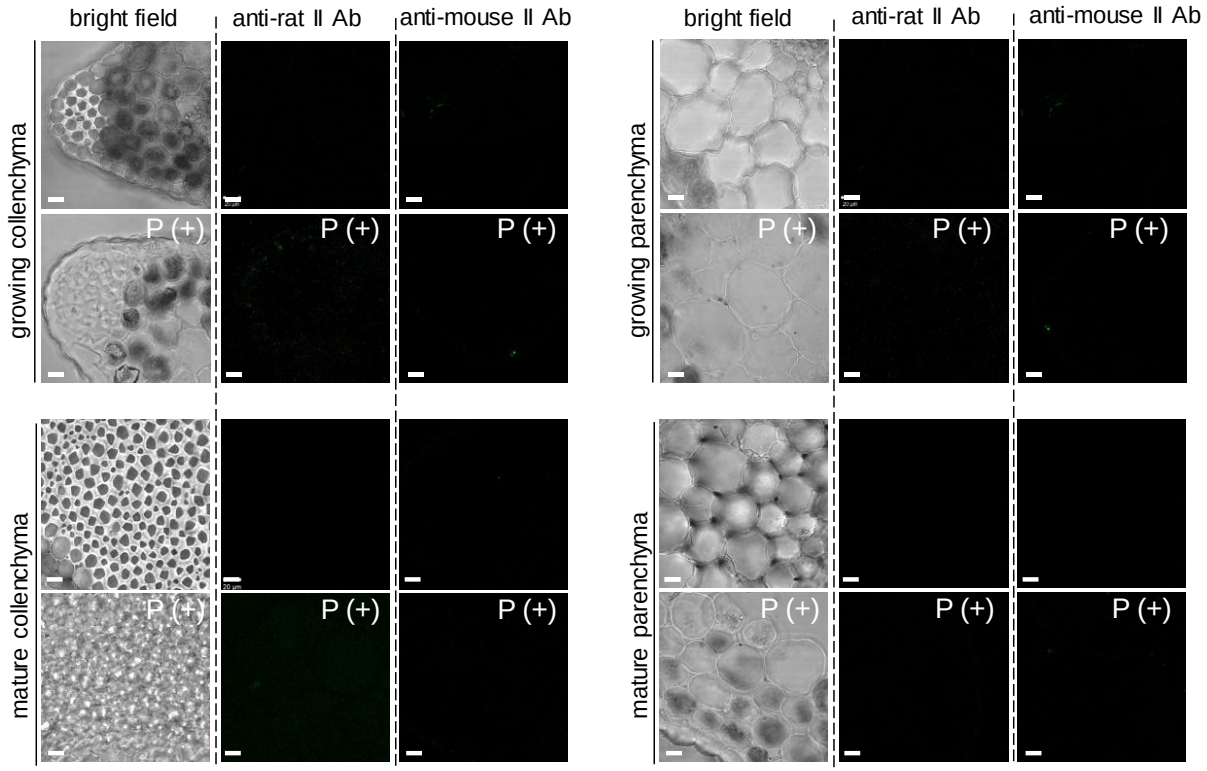
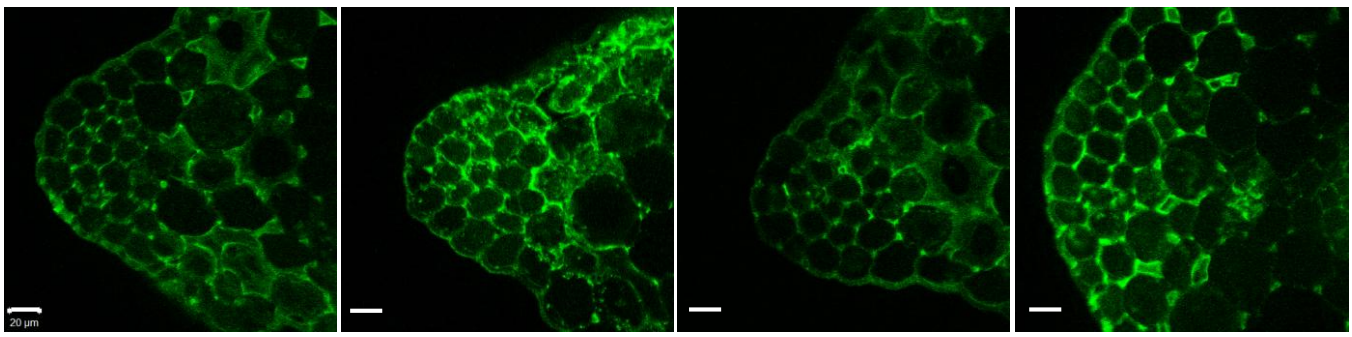


Figure S5. Cross-sections used as negative controls (the primary antibody was not added during immunolabeling). P (+) – sections after pectinase pretreatment. Bright field images display the morphology of the cells. Scale bar: 20 µm.

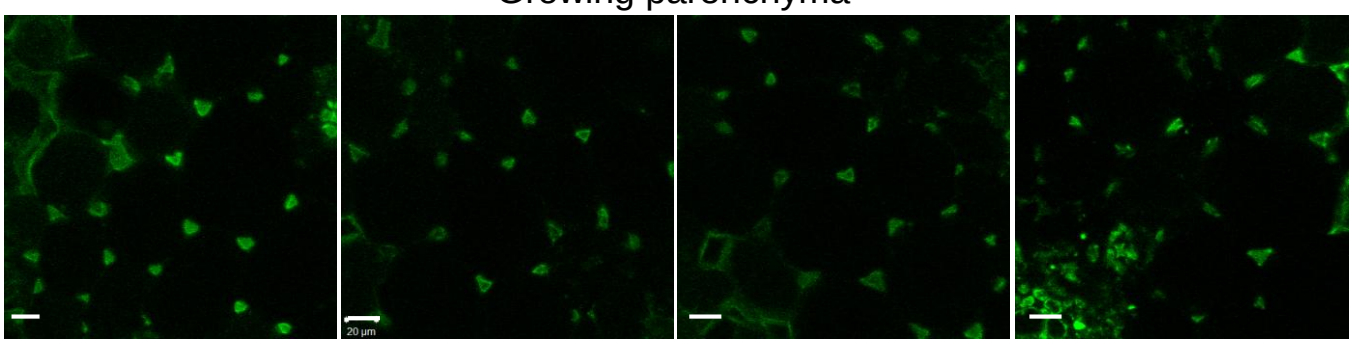
Figure S6. Immunolocalization of polysaccharide epitopes in collenchyma and parenchyma cell walls at two developmental stages in 4 replicates.

Long fragments of unesterified homogalacturonan
PAM1

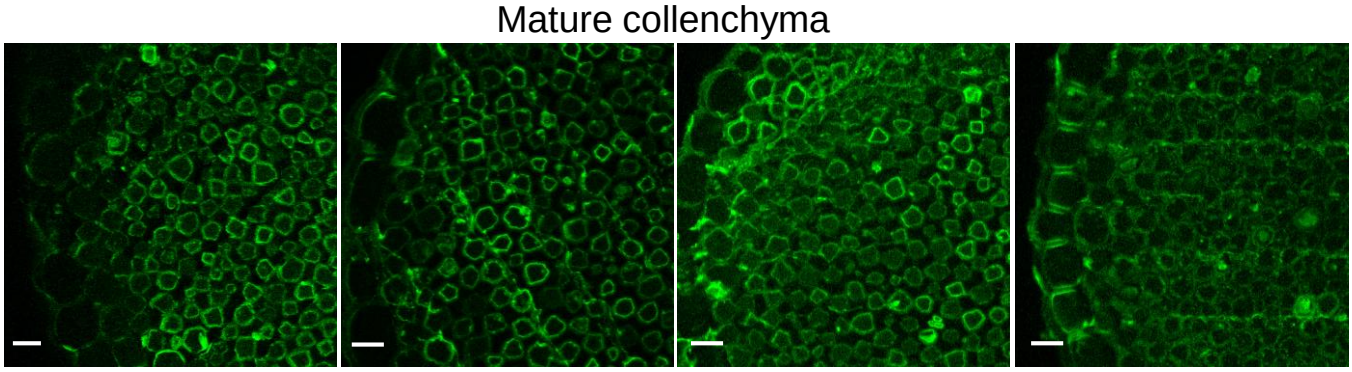
Growing collenchyma



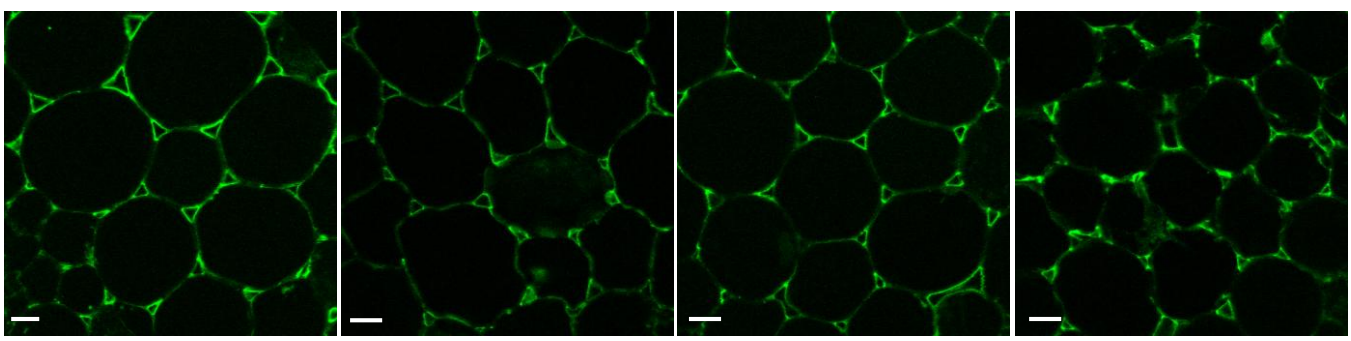
Growing parenchyma



Mature collenchyma



Mature parenchyma

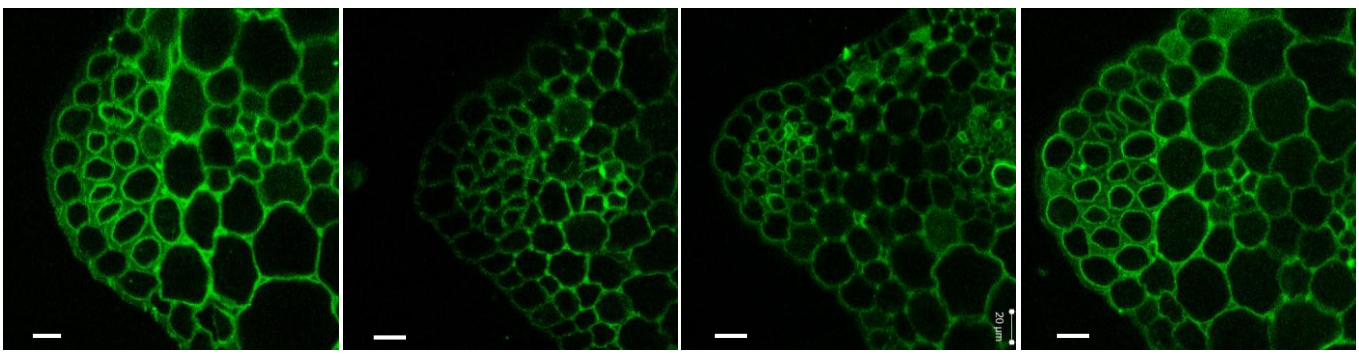


Scale bar 20 µm

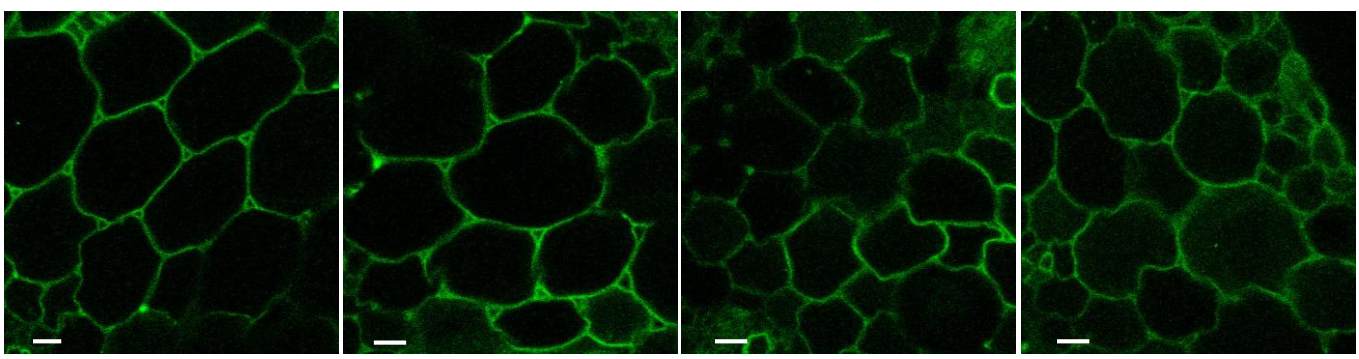
Partially esterified homogalacturonan

JIM5

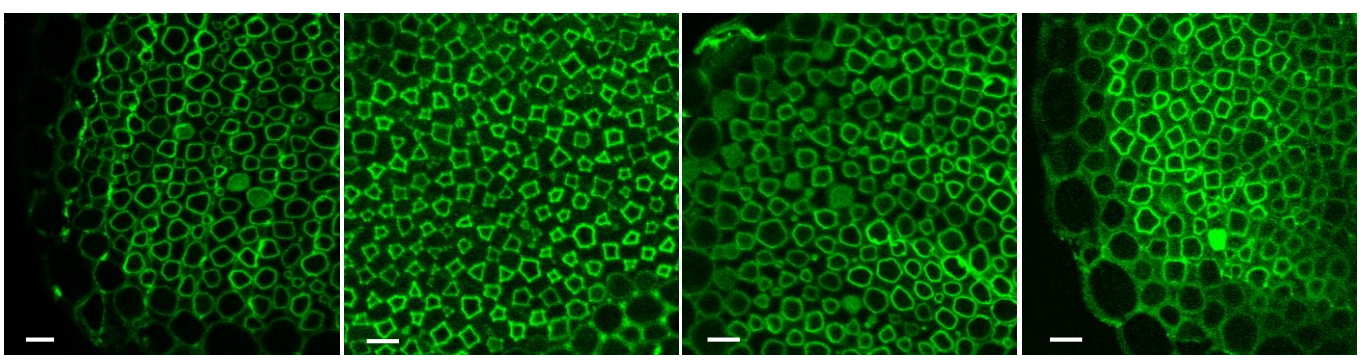
Growing collenchyma



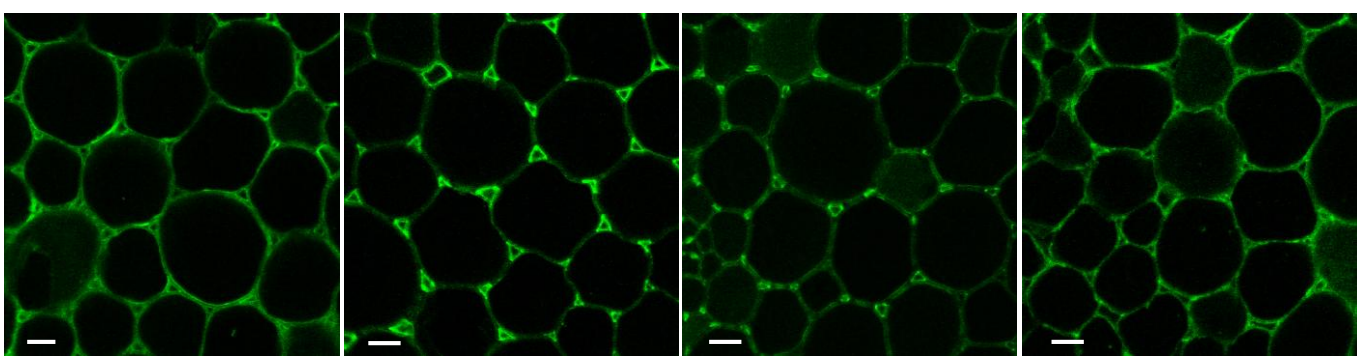
Growing parenchyma



Mature collenchyma



Mature parenchyma

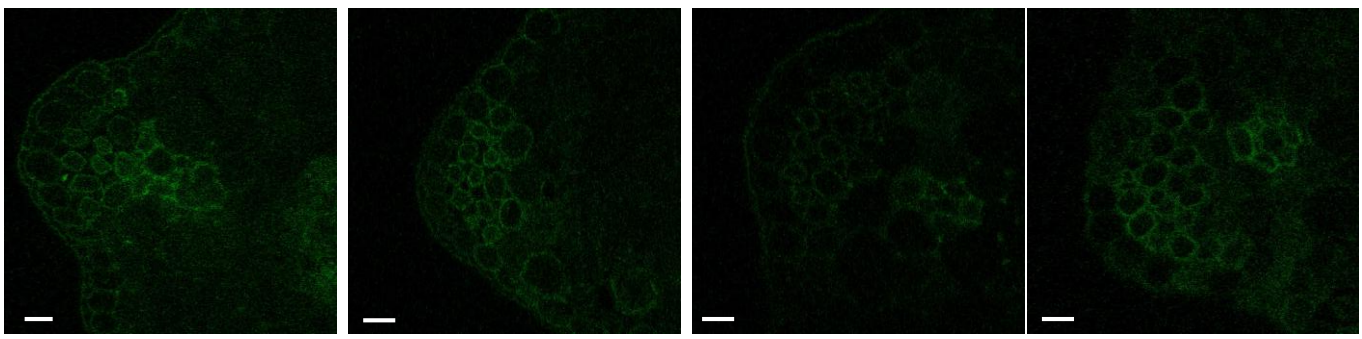


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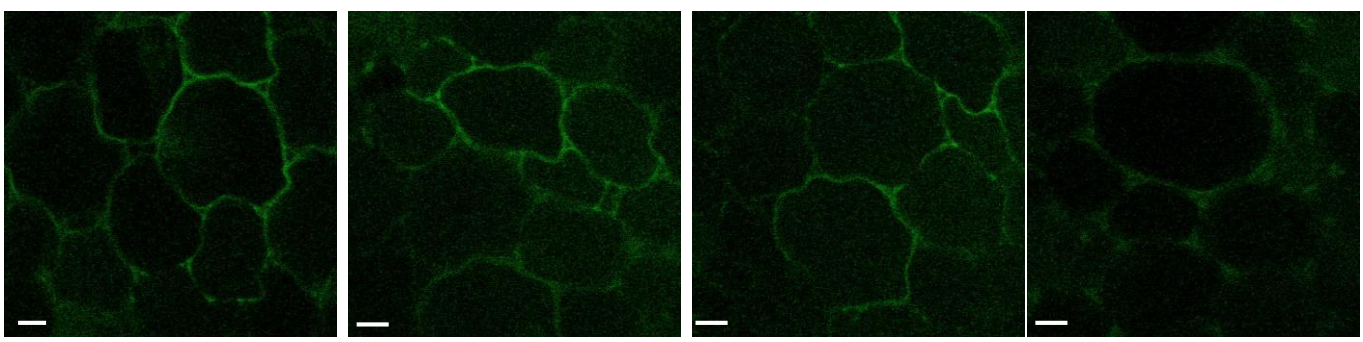
Esterified homogalacturonan

JIM7

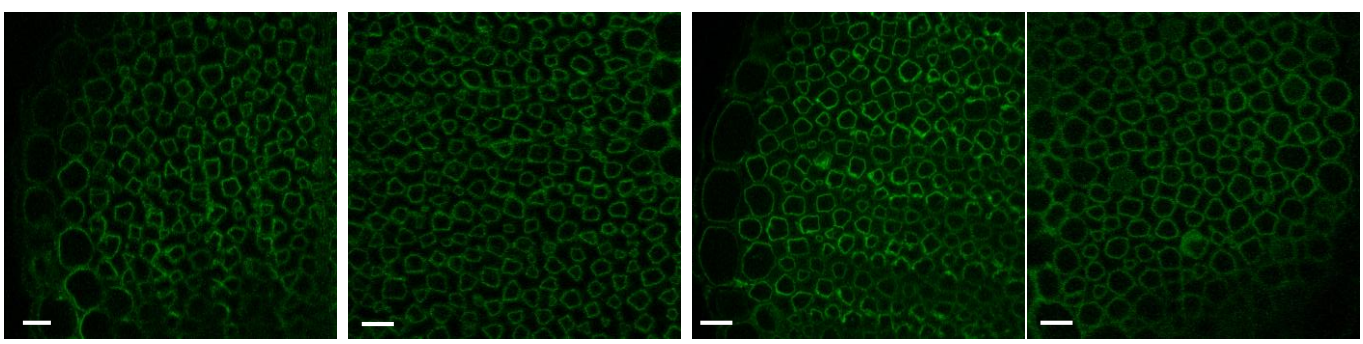
Growing collenchyma



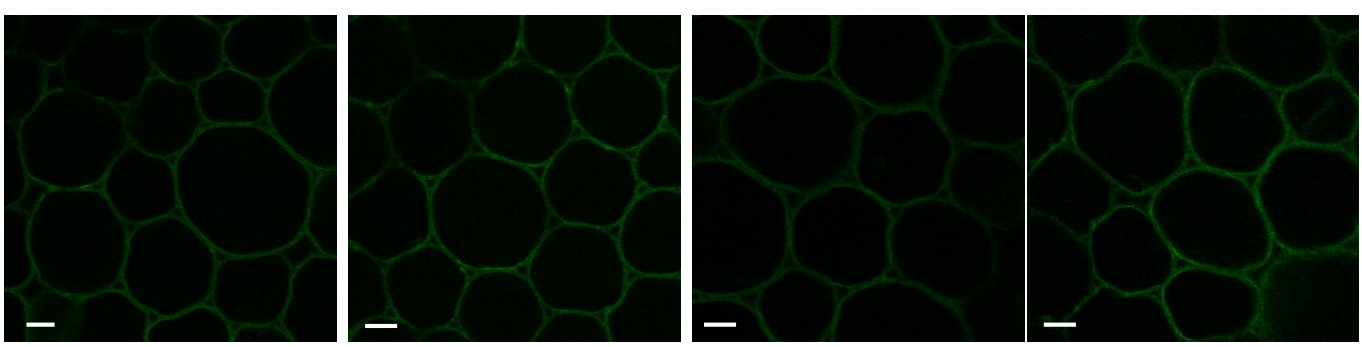
Growing parenchyma



Mature collenchyma



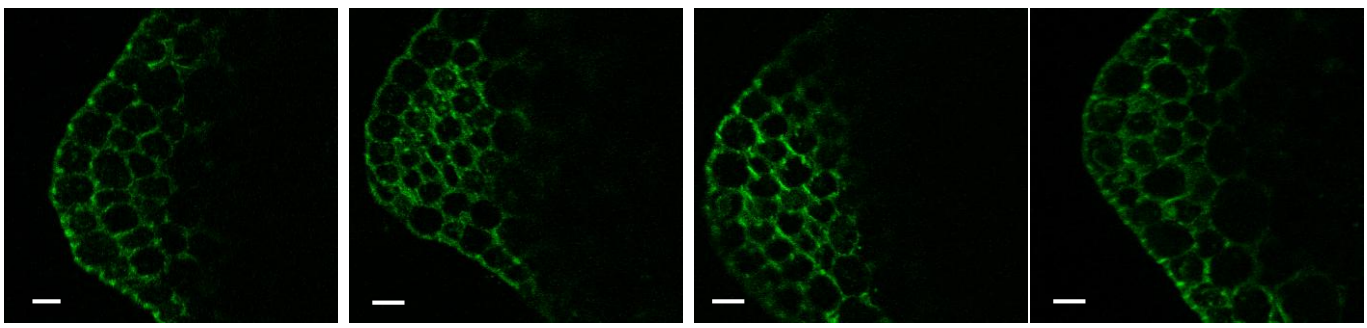
Mature parenchyma



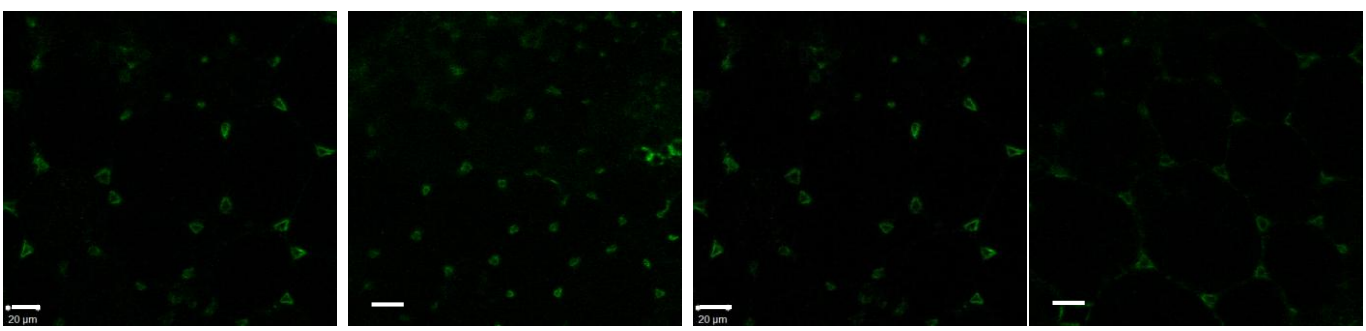
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Rhamnogalacturonan I backbone
INRA-RU2

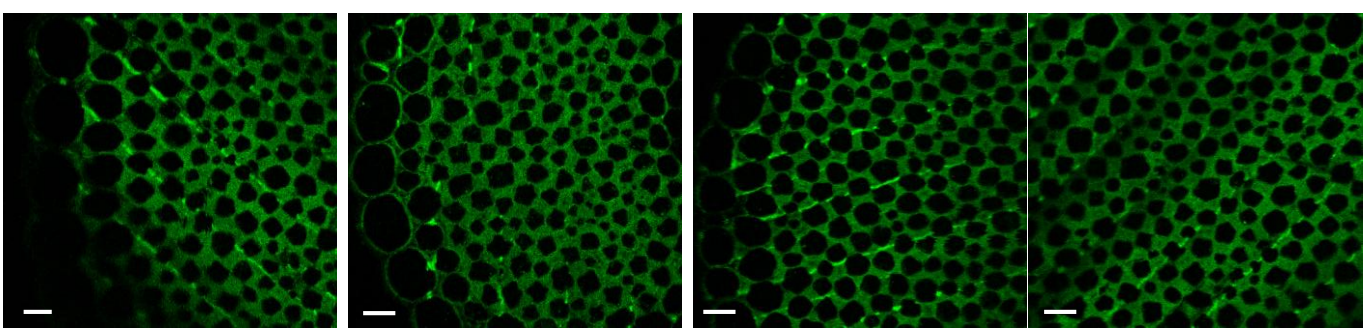
Growing collenchyma



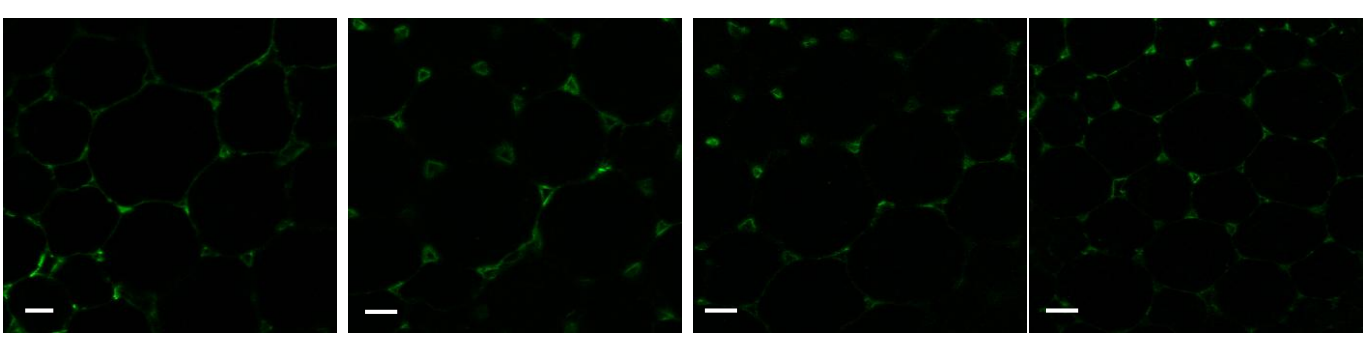
Growing parenchyma



Mature collenchyma



Mature parenchyma

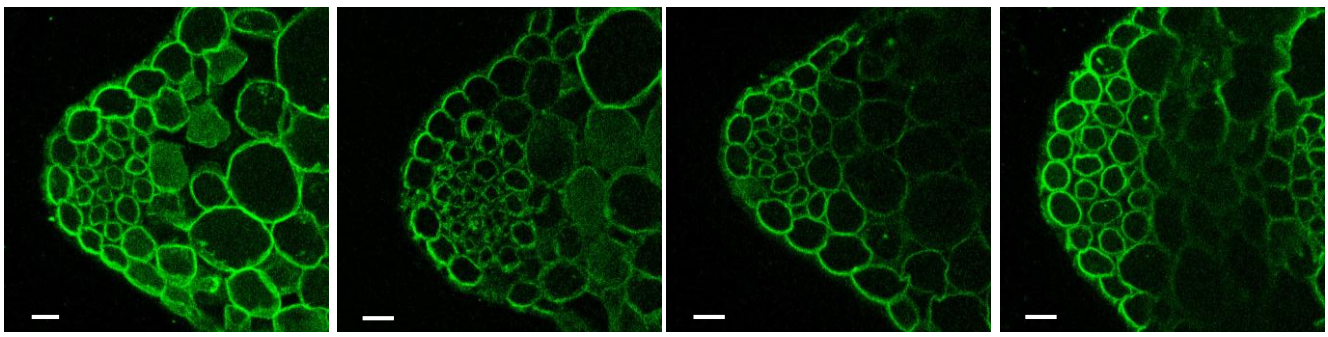


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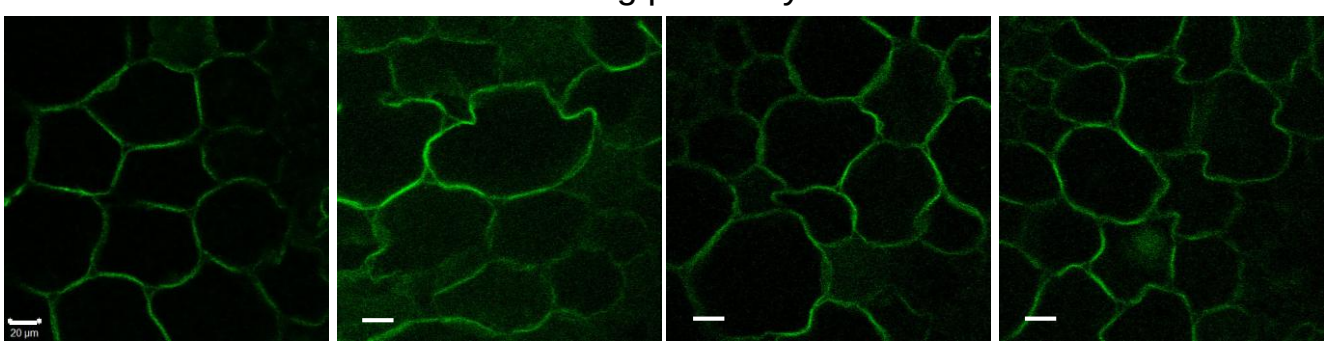
Linear β-(1,4)-D-galactan

LM5

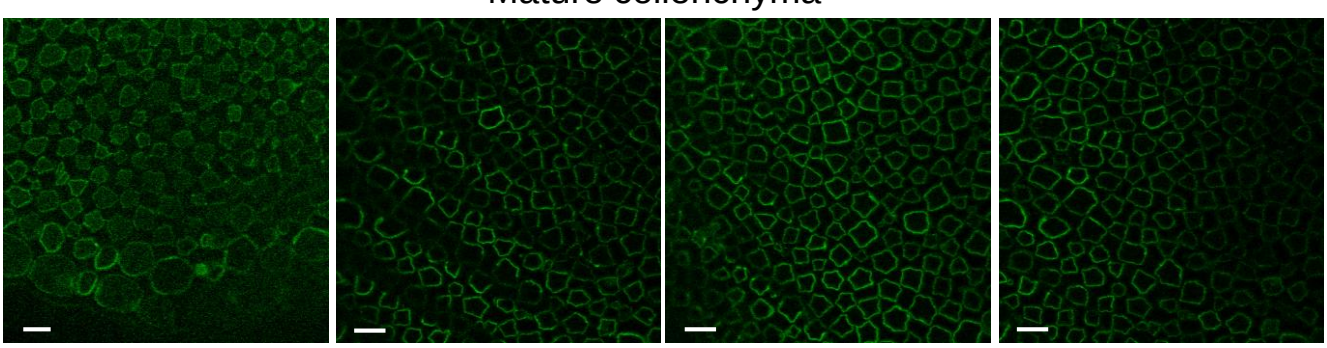
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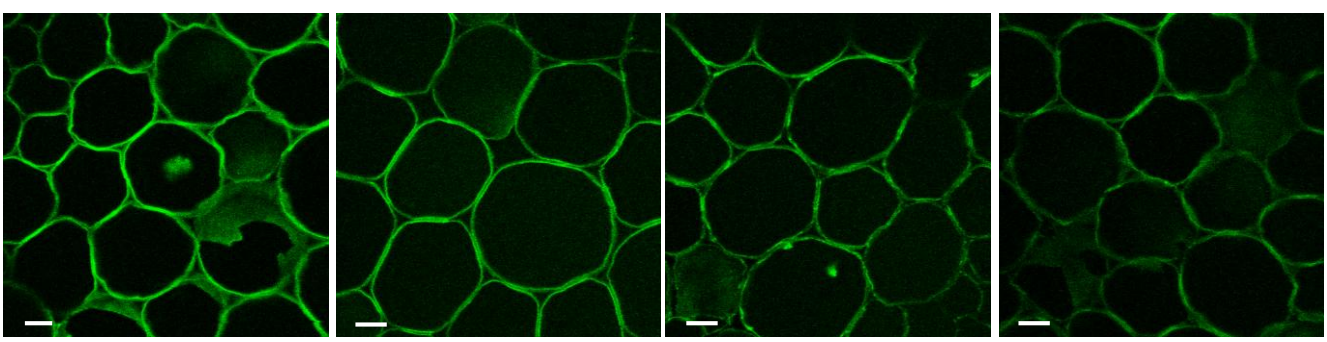
Growing parenchyma



Mature collenchyma



Mature parenchyma

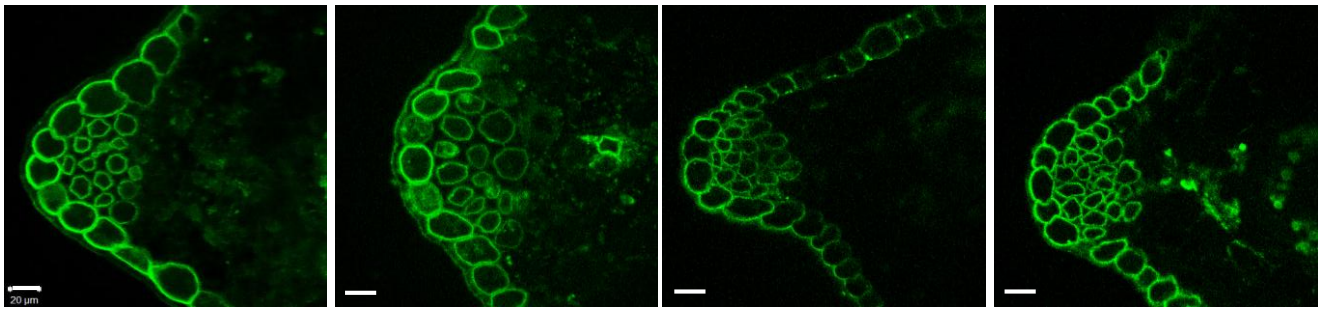


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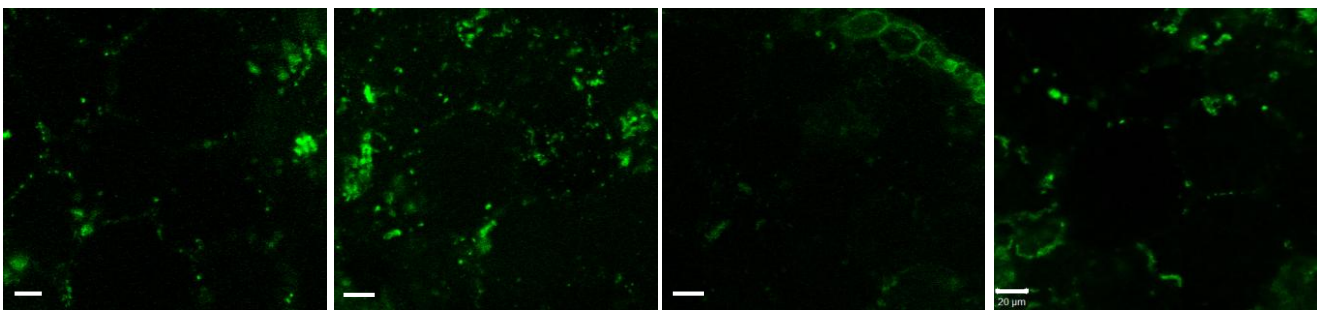
Branched β-(1,4)-D-galactan

LM26

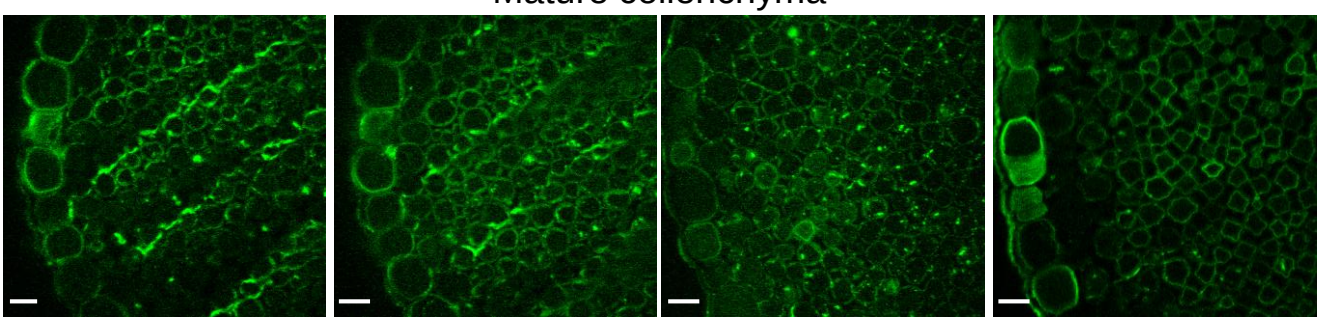
Growing collenchyma



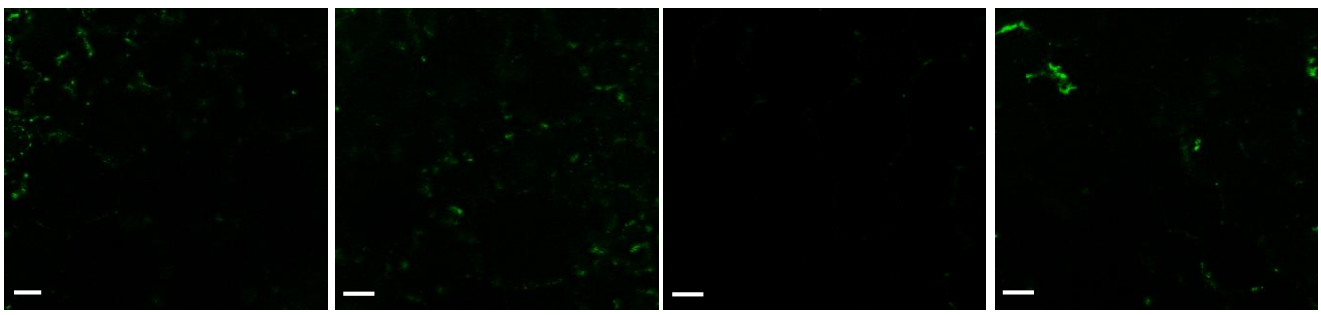
Growing parenchyma



Mature collenchyma



Mature parenchyma

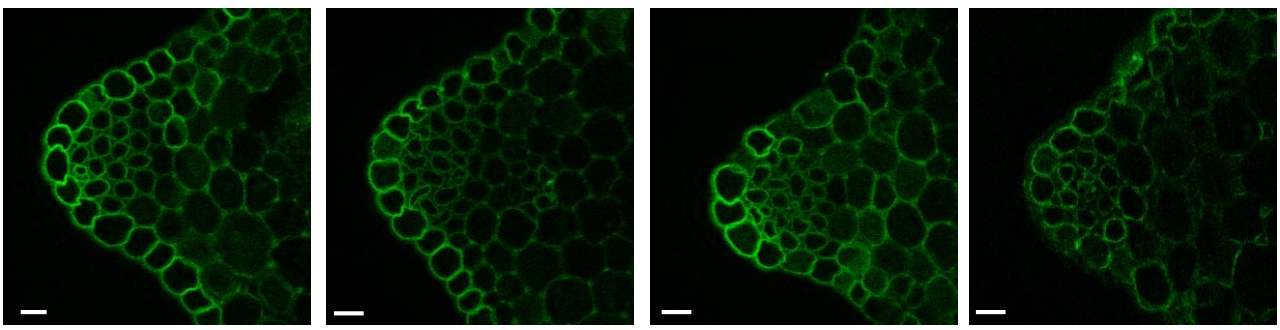


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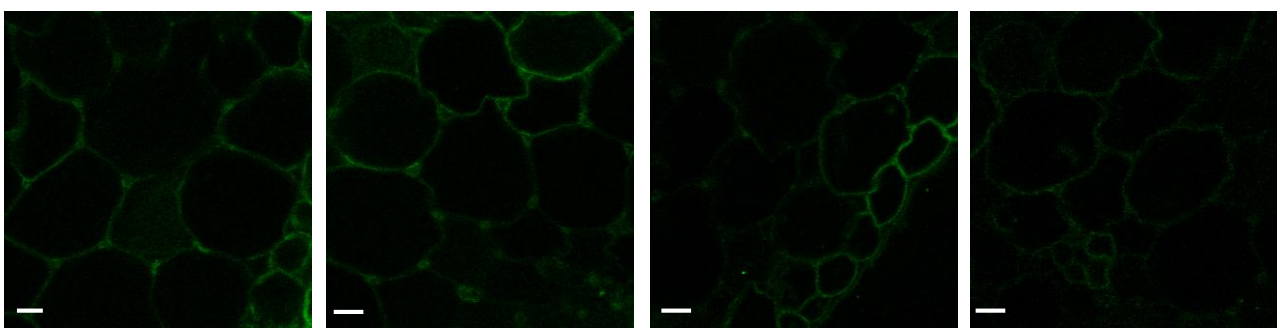
Linear α-(1,5)-L-arabinan

LM6

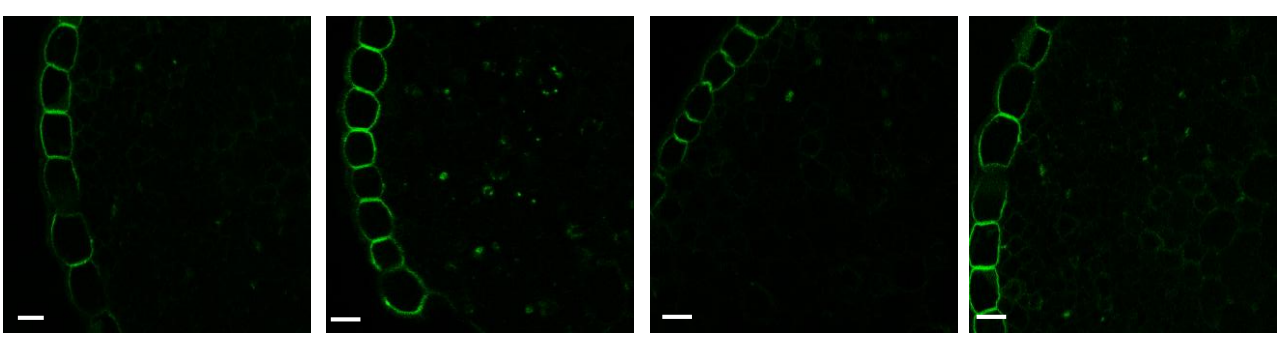
Growing collenchyma



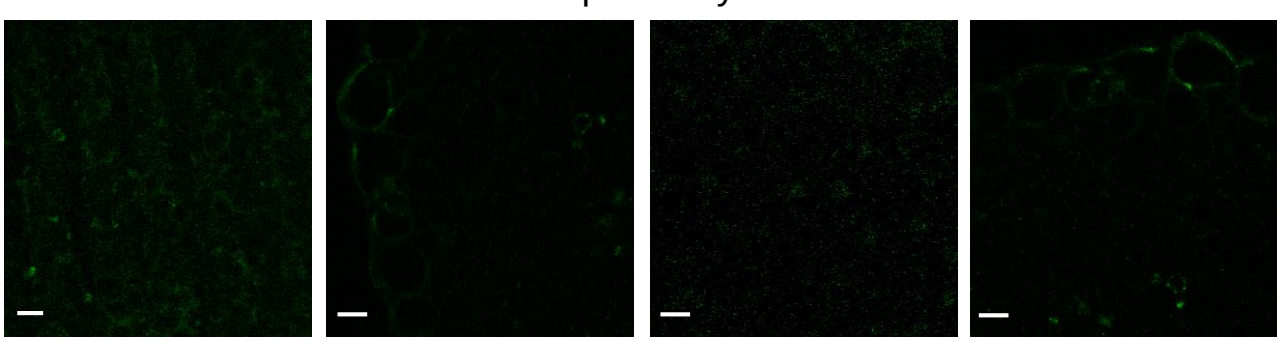
Growing parenchyma



Mature collenchyma



Mature parenchyma

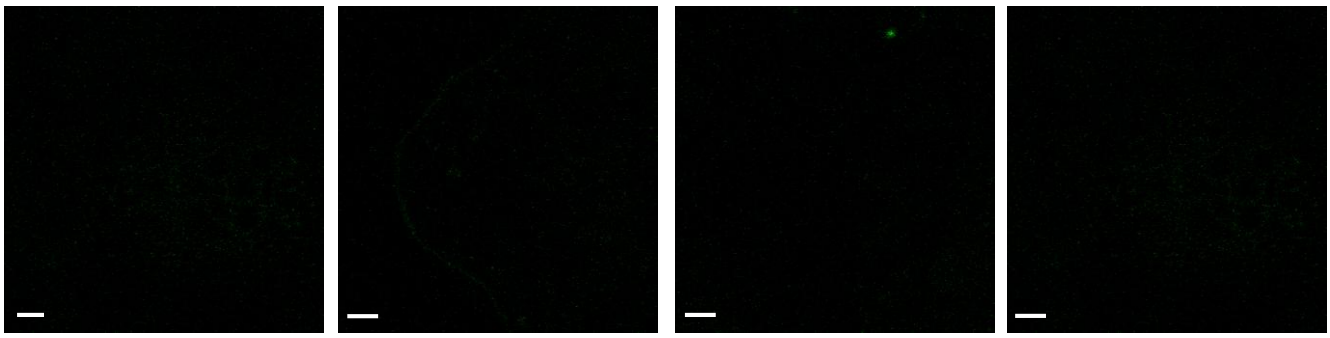


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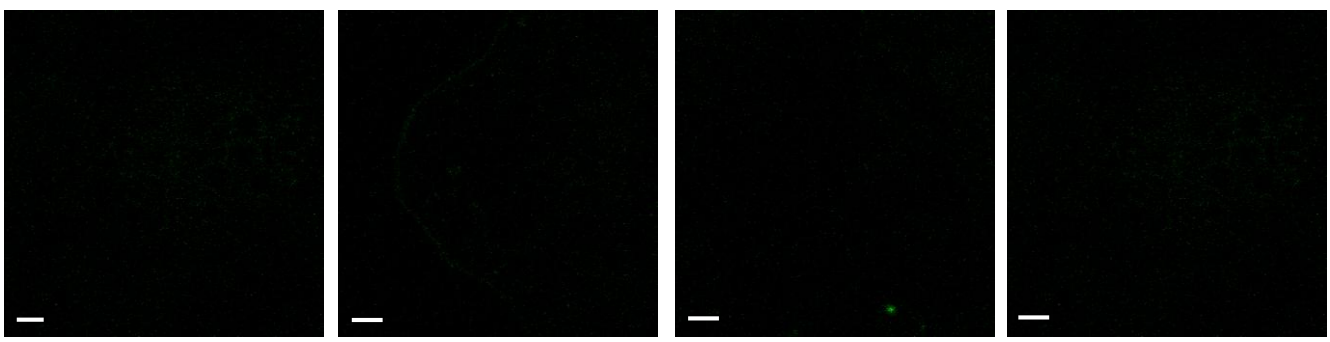
Type I arabinogalactan

INRA-AGI-1

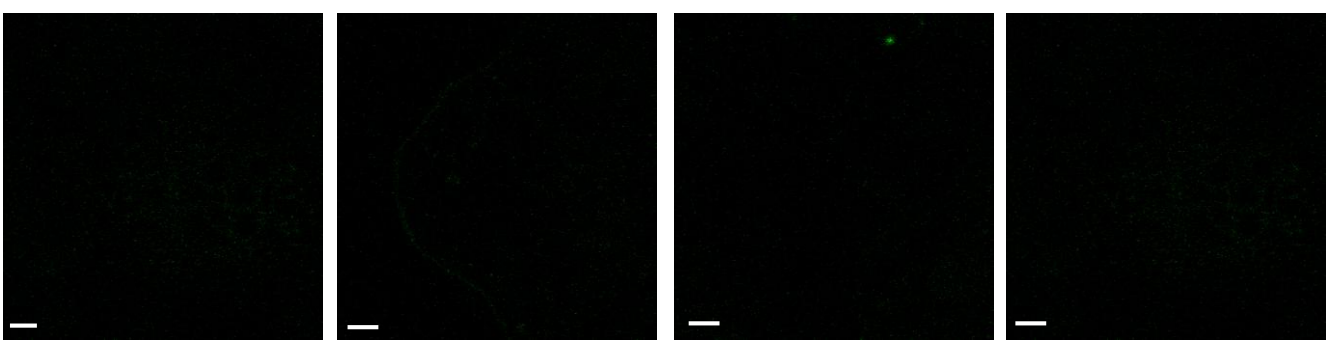
Growing collenchyma



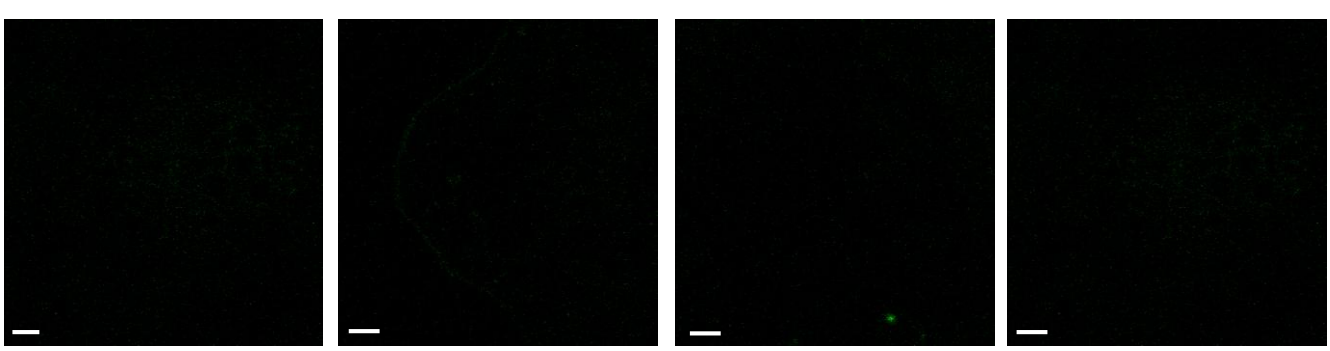
Growing parenchyma



Mature collenchyma



Mature parenchyma

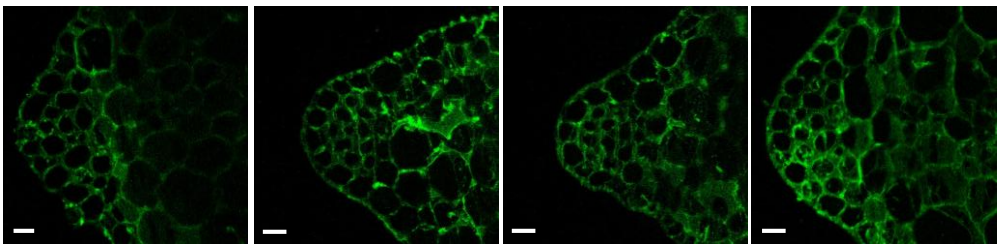


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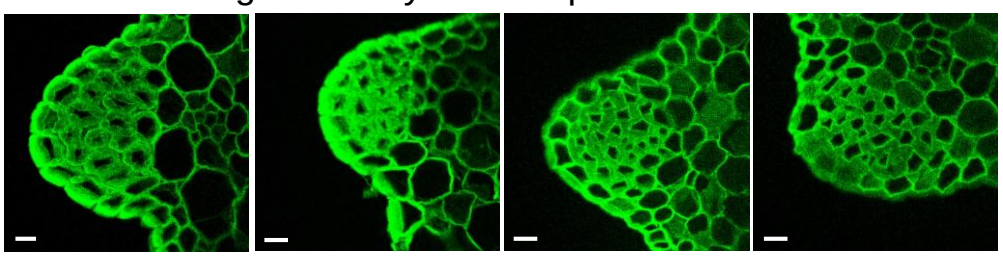
XXXG/XXLG/XLLG-motives of xyloglucan

LM25

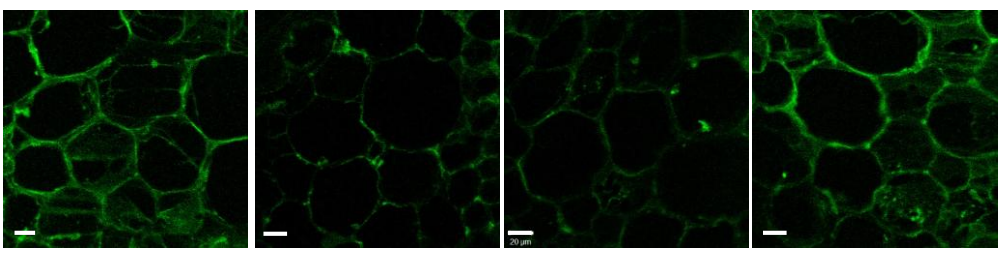
Growing collenchyma without pectinase treatment



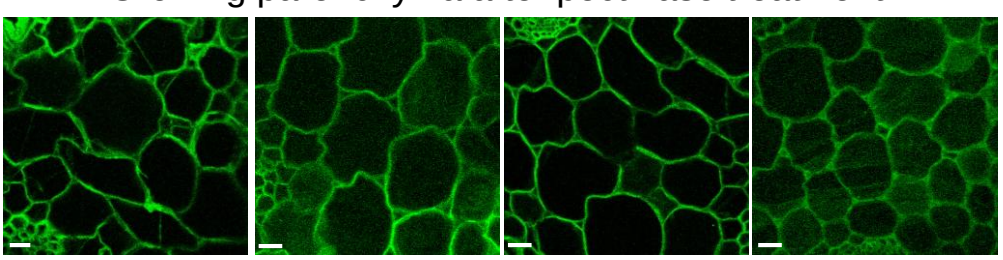
Growing collenchyma after pectinase treatment



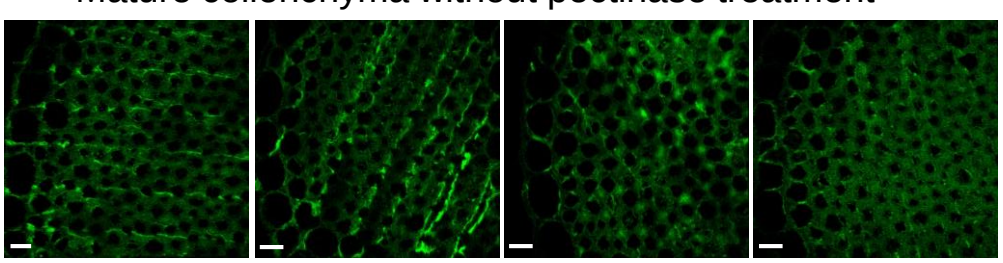
Growing parenchyma without pectinase treatment



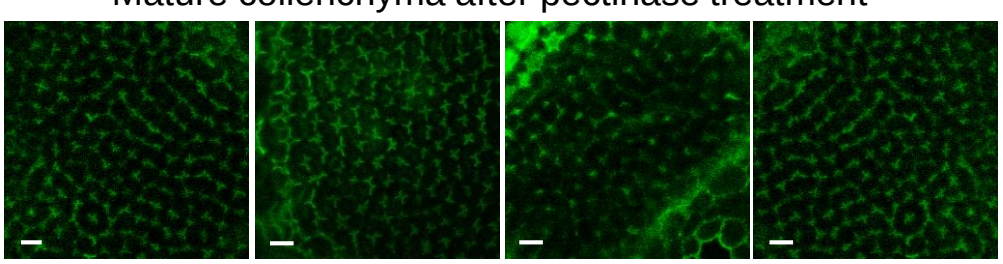
Growing parenchyma after pectinase treatment



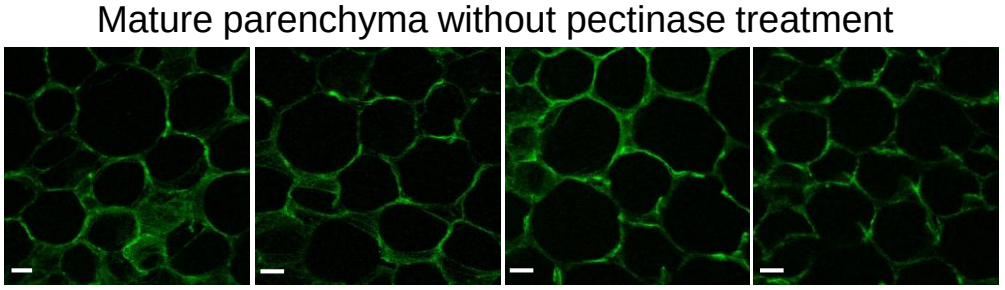
Mature collenchyma without pectinase treatment



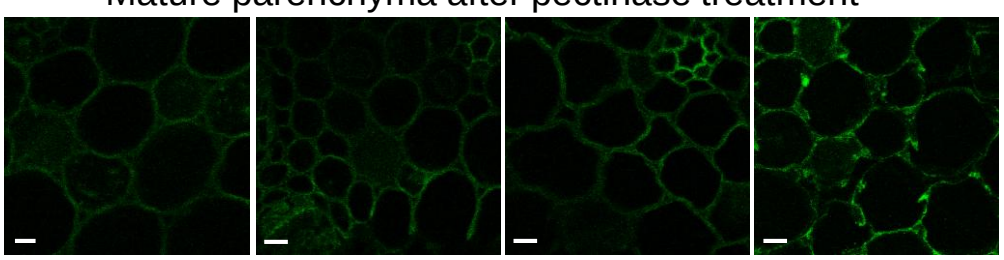
Mature collenchyma after pectinase treatment



Mature parenchyma without pectinase treatment



Mature parenchyma after pectinase treatment

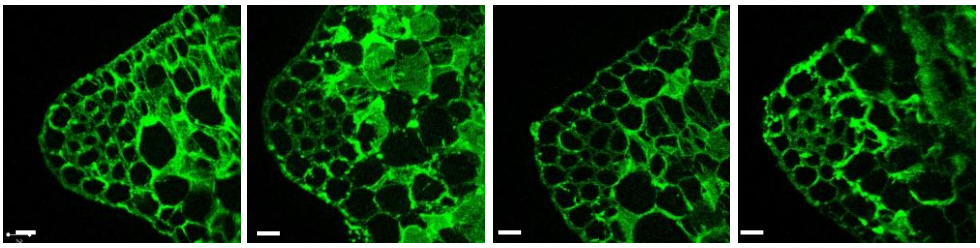


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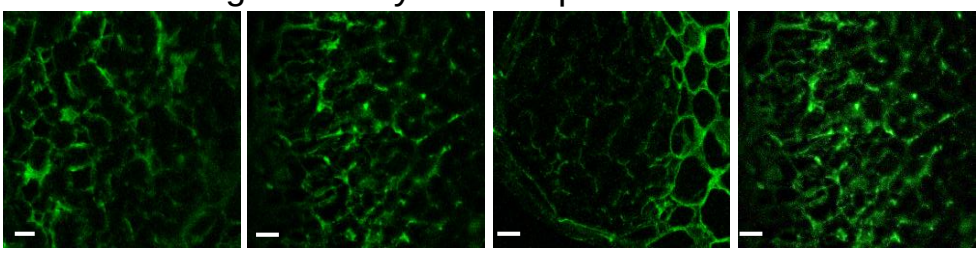
Heteromannan

LM21

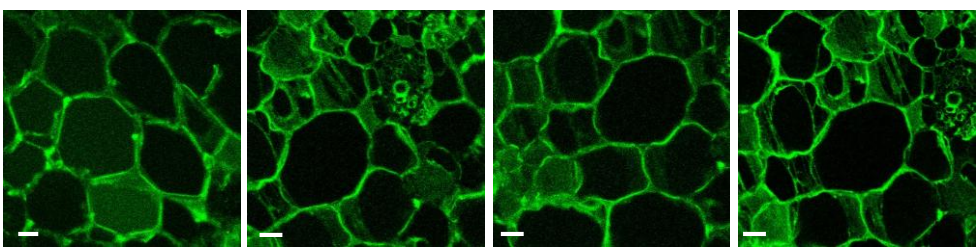
Growing collenchyma without pectinase treatment



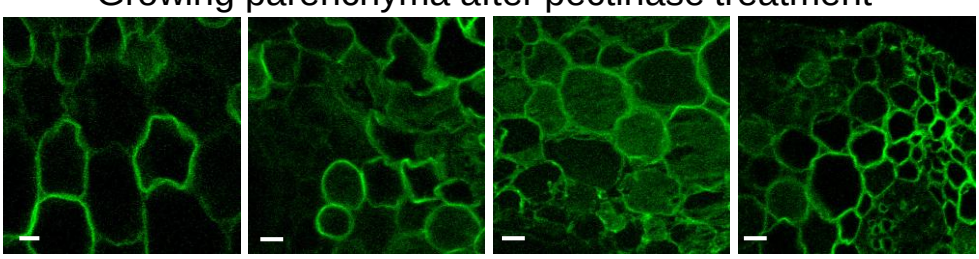
Growing collenchyma after pectinase treatment



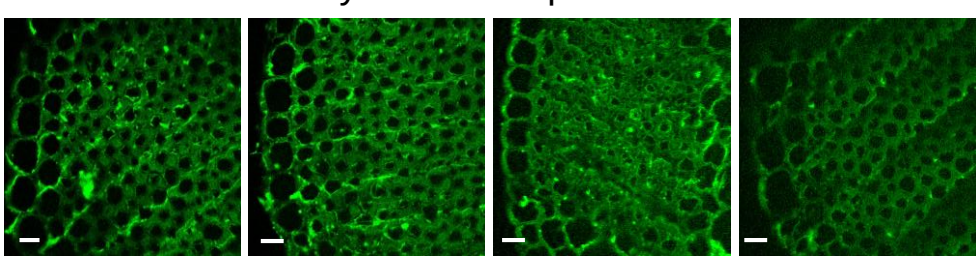
Growing parenchyma without pectinase treatment



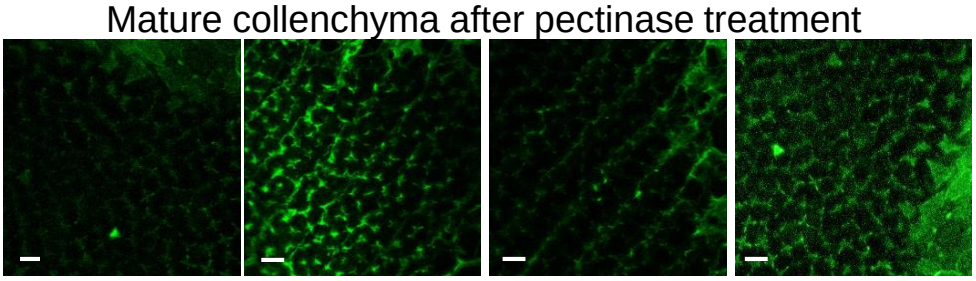
Growing parenchyma after pectinase treatment



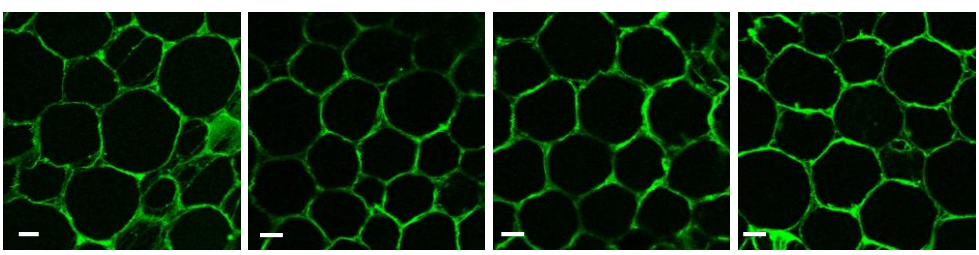
Mature collenchyma without pectinase treatment



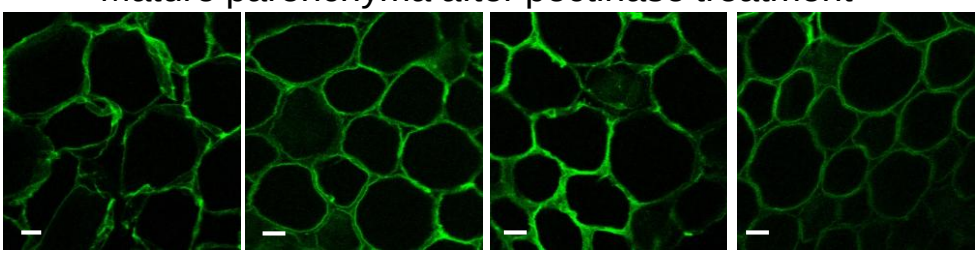
Mature collenchyma after pectinase treatment



Mature parenchyma without pectinase treatment



Mature parenchyma after pectinase treatment

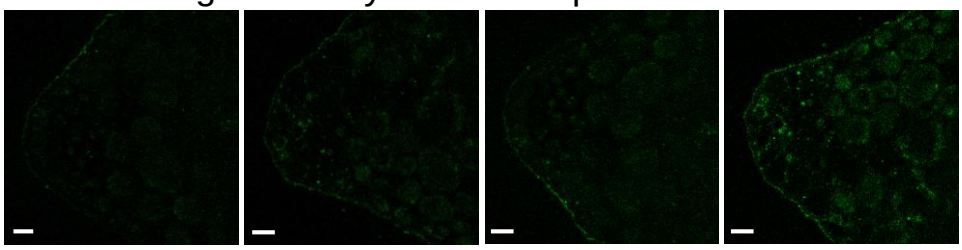


Scale bar 20 µm

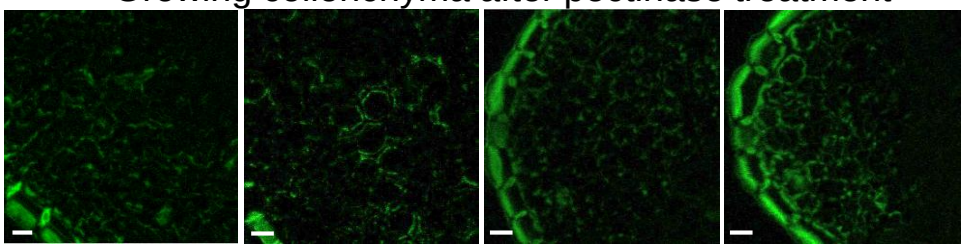
Xylan

LM11

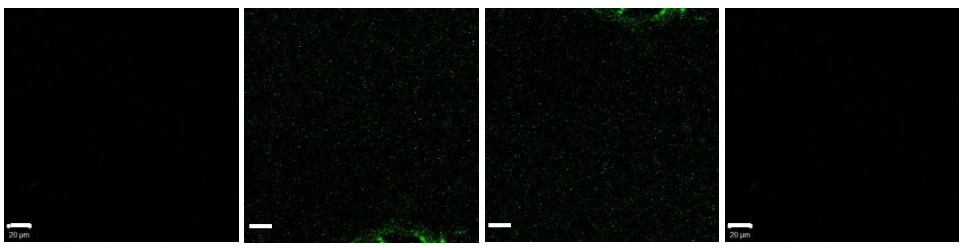
Growing collenchyma without pectinase treatment



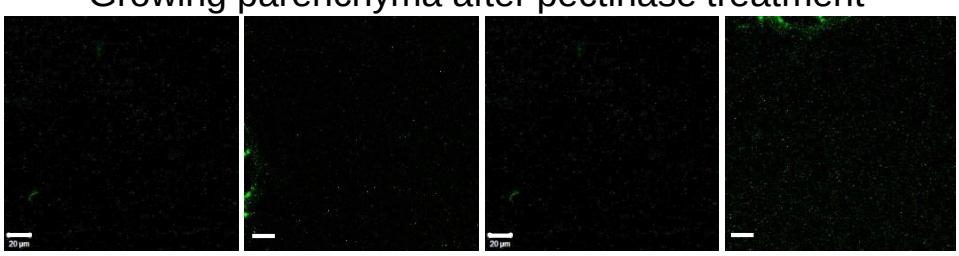
Growing collenchyma after pectinase treatment



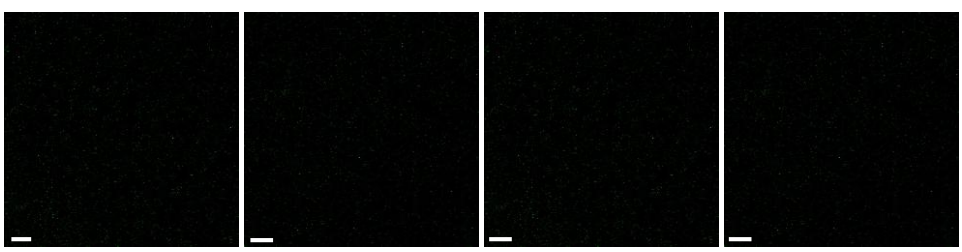
Growing parenchyma without pectinase treatment



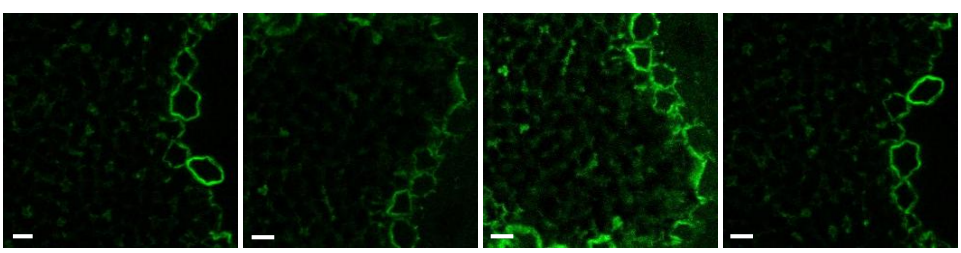
Growing parenchyma after pectinase treatment



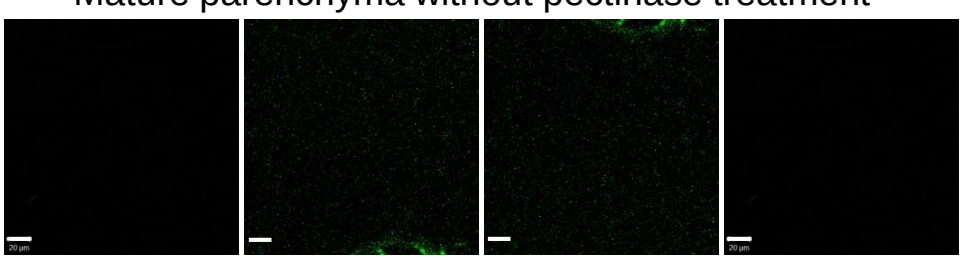
Mature collenchyma without pectinase treatment



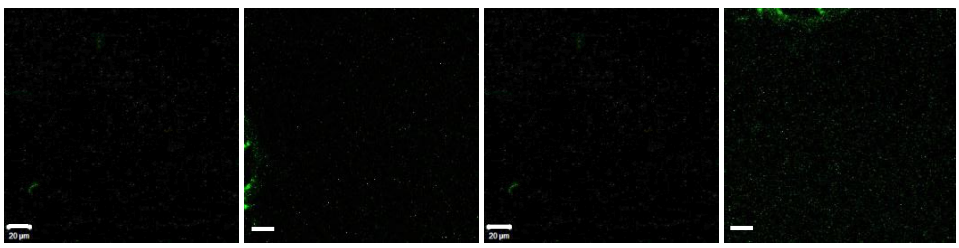
Mature collenchyma after pectinase treatment



Mature parenchyma without pectinase treatment



Mature parenchyma after pectinase treatment

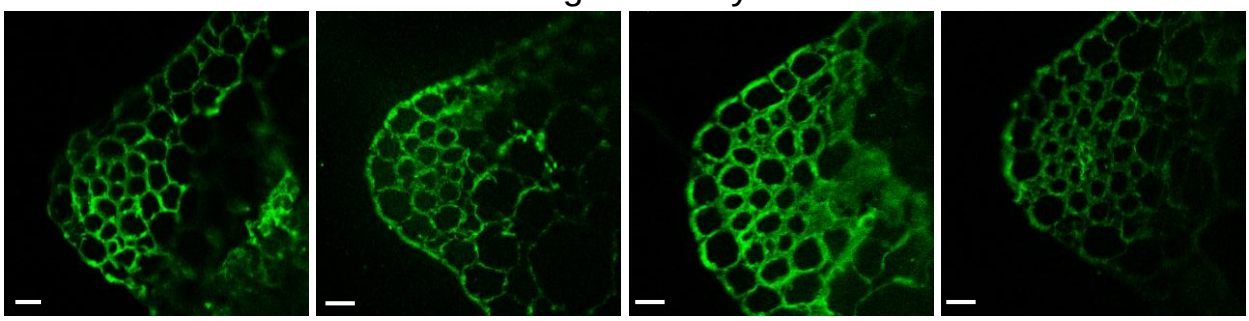


Scale bar 20 µm

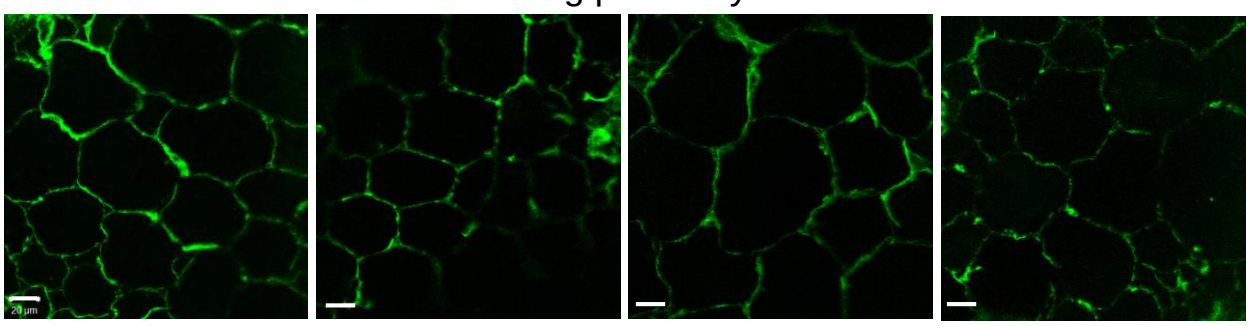
Crystalline cellulose

CBM3a

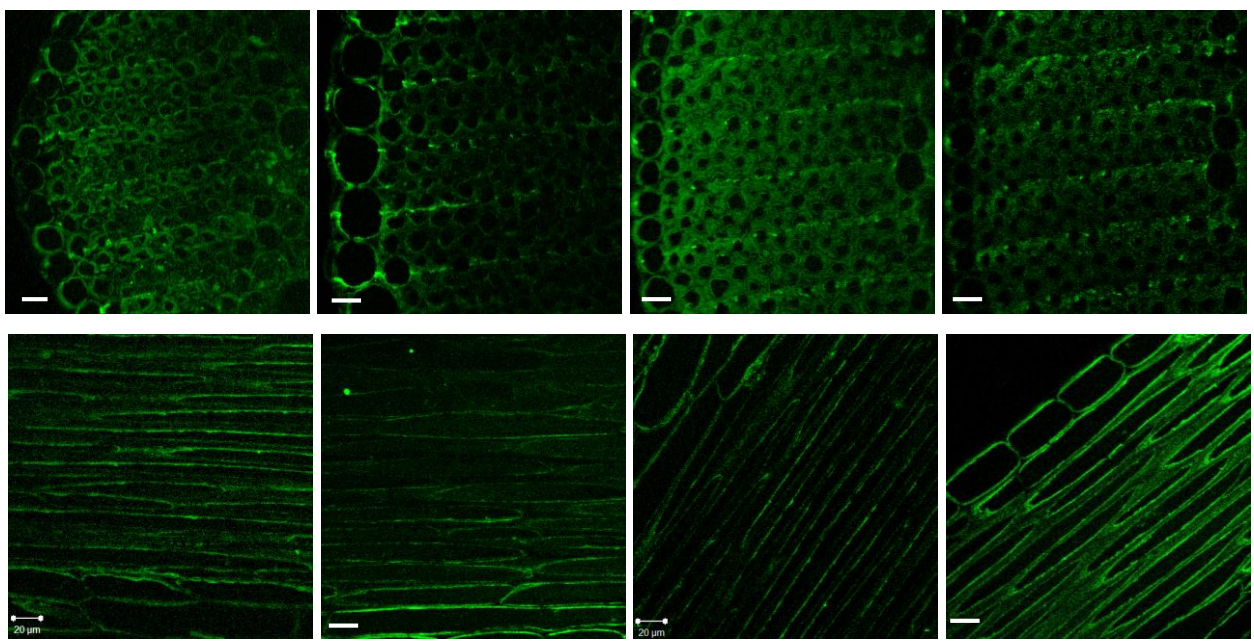
Growing collenchyma



Growing parenchyma

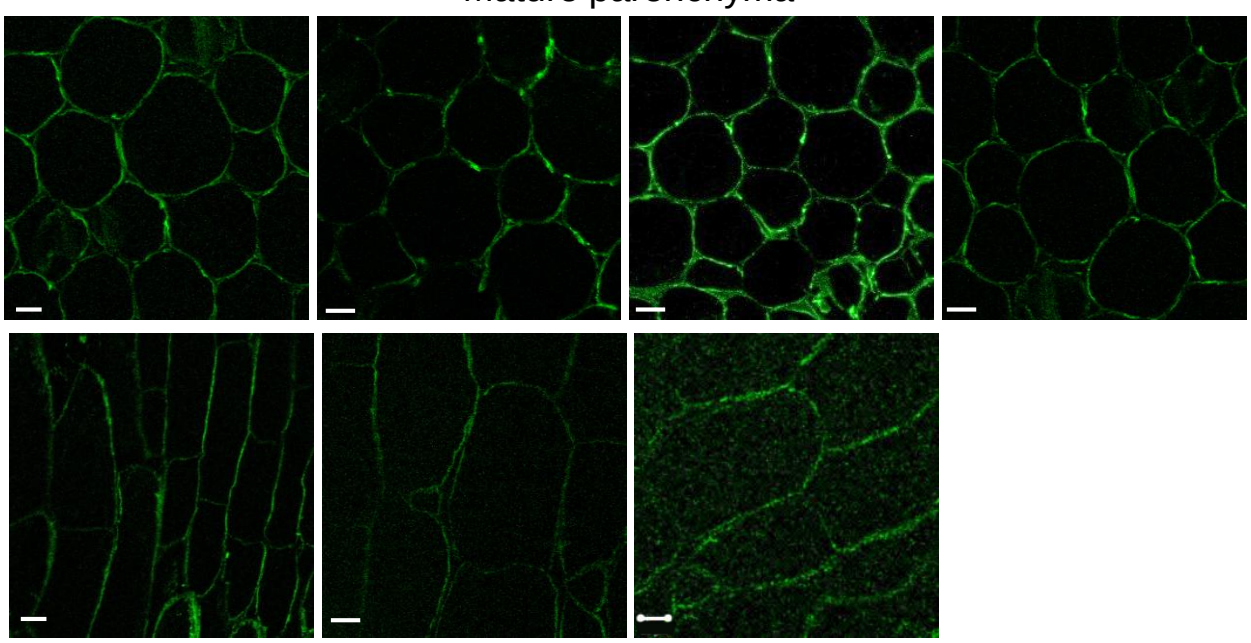


Mature collenchyma



longitudinal

Mature parenchyma

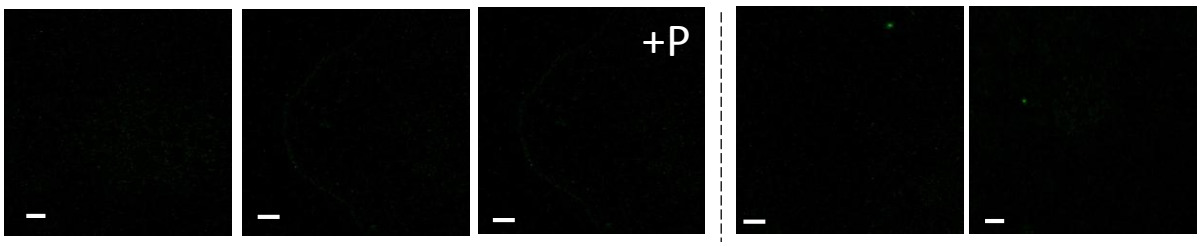


longitudinal

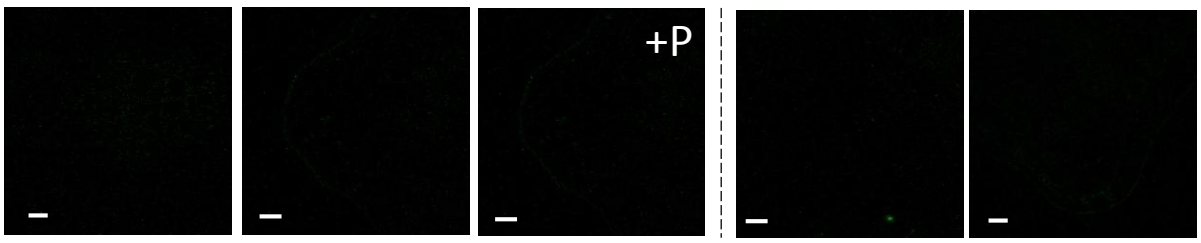
Scale bar 20 µm

Negative controls (no primary antibody added)

Growing collenchyma



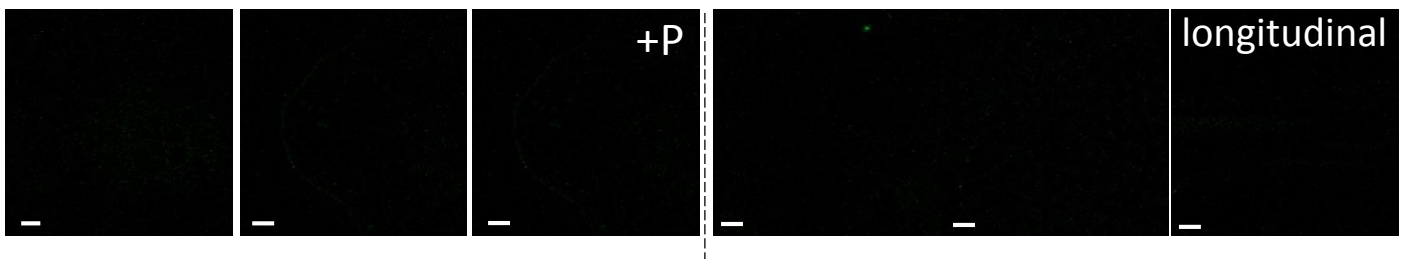
Growing parenchyma



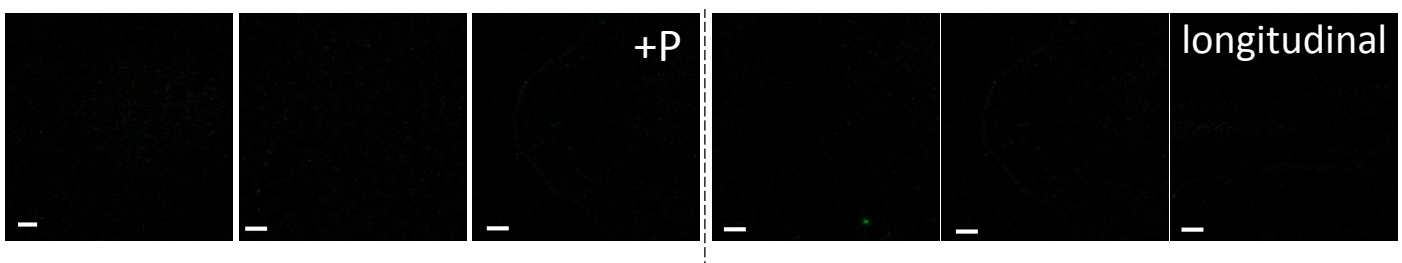
For “antirat” antibodies

For “antimouse” antibodies

Mature collenchyma



Mature parenchyma



For “antirat” antibodies

For “antimouse” antibodies

Scale bar 20 µm