Mechanical properties of genetically modified *populus* cell walls

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Our aims

- To study the effect of SuSy and C4H genes on structure & property in plant cell walls
- To clarify the mechanical roles of individual polymers in plant cell walls

Materials

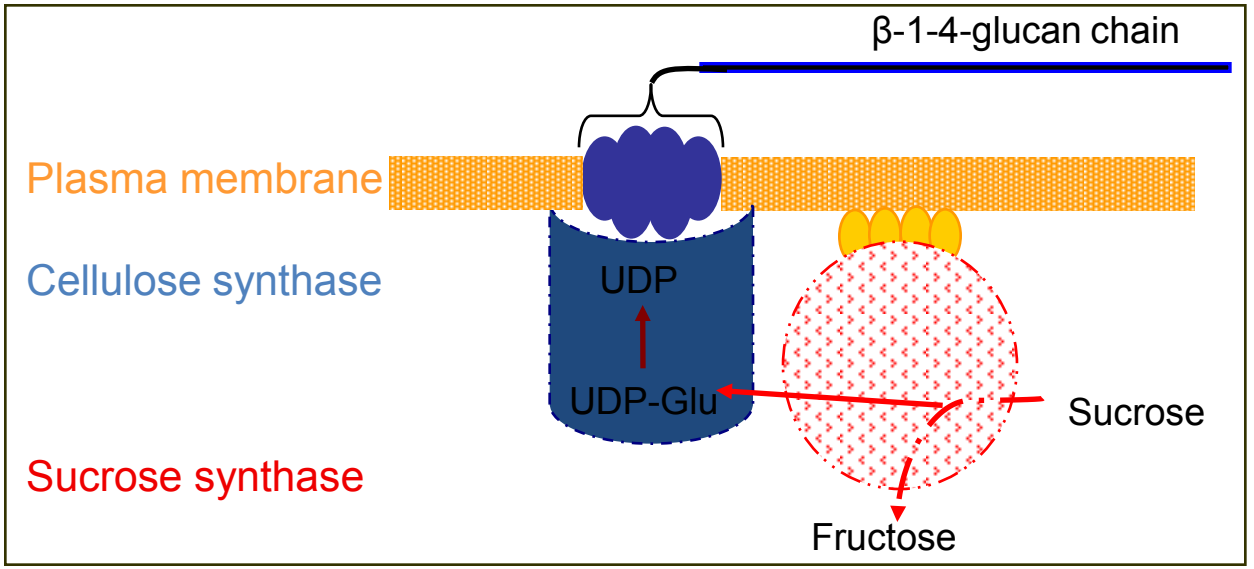
Transgenic *populus*

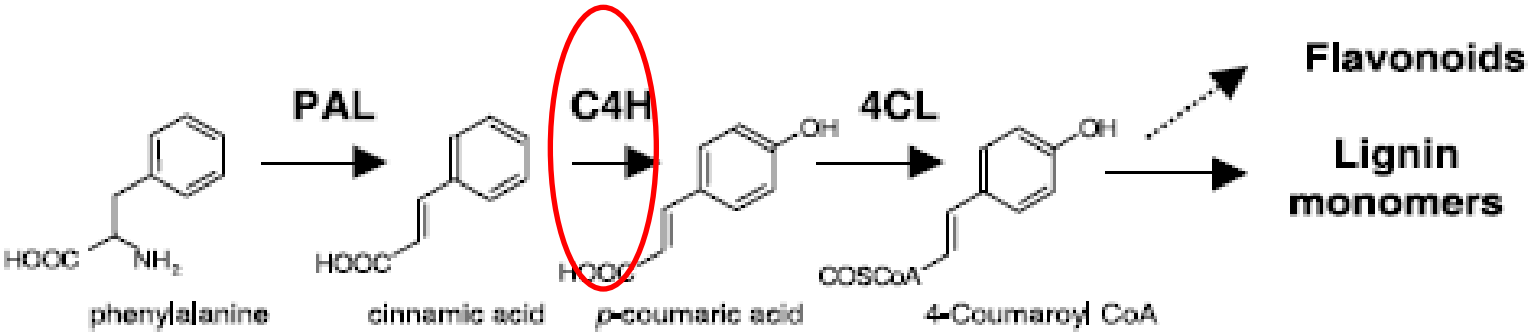
- **SuSy:**

Sucrose Synthase

- **C4H:**

Cinnamate 4-Hydroxylase





STRUCTURE ANALYSIS

Anatomical parameters

Cell wall density

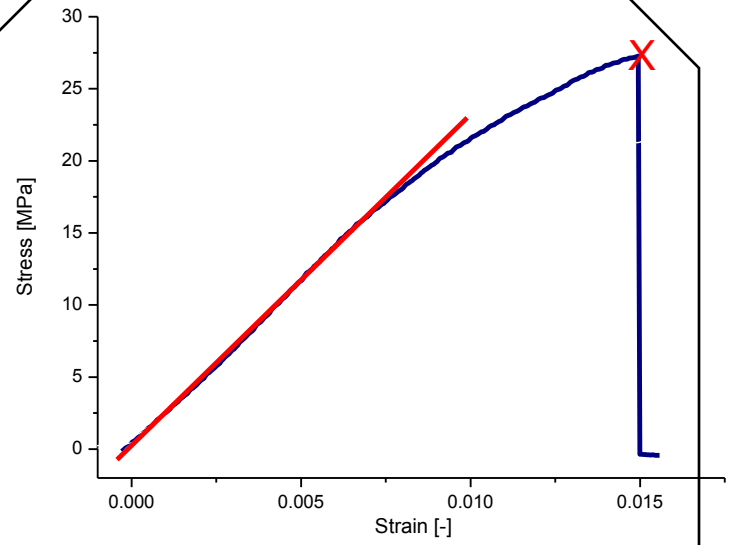
Microfibril angle

Crystallinity

Cellulose fibril size

Chemical components

MECHANICAL PROPERTIES



Stiffness *Strength*

Ultimate strain *Fracture paths*

Results….

- Down-regulation of SuSy, C4H genes in *populus* didn't result in obvious alterations of wood tissue formation
- No obvious differences in cell wall shapes, MFA etc
- Relative crystallinity, cellulose fibril size, and density were reduced in SuSy *populus* trees
- Stiffness and strength were significantly decreased in SuSy transgenic trees, no statistical changes for C4H
- SuSy gene may have an impact on nanostructure and mechanical properties of cellulose fibril