The Cellulose Synthesis Complex (CSC) is made of Three Cellulose Synthases (CesAs) in a 1:1:1 ratio

Scientific Achievement
The CSC in *Arabidopsis* 2° cell walls has a fixed and equimolar stoichiometry of 3 CesAs, indicating a non-fluid structure based on a hetero-trimeric CesA building block.

Significance and Impact
The arrangement of cellulose synthase proteins is one key factor controlling the final structure of the cellulose microfibril. Plants utilize a hexameric rosette composed of an unknown number of CesAs in an unidentified stoichiometry. Our results show CesAs exist in an equimolar stoichiometry, supporting a 18-CesA model of the complex. This information is essential for understanding how CesAs assemble into CSCs.

Research Details
– Quantitative immunoblotting to determine molar amount of CesAs 4, 7, and 8, which shows a 1:1:1 stoichiometry;
– Analysis of protein levels along the axis of the stem shows that this equimolar stoichiometry is fixed throughout development;
– This equimolar stoichiometry, and recent literature on cellulose microfibril size, argue for a cellulose synthesis complex model of 18 active CesAs as a hexamer of trimers;